

[33 cont.]

136 Among the dangerous insects, the anopheles mosquito naturally comes first. It is present in enormous numbers during the [34] rainy season. In some places, small reddish-brown ticks are common. The Glossina [tsetse fly] seems to be absent; I encountered them only in the Kunene swamps. Among human parasites, bugs and fleas are practically unknown; on the other hand, lice are extraordinarily common, without being especially noticed by their owners.

9. The Water Supply

● 312 During the dry season, the water supply plays a decisive role. Every Bushman carries in his quiver the two reed tubes for the so-called Bushman well. It is by no means true, however, that the Bushmen are able to obtain water in this way at any time and place. It is only in places where some dampness is still visible [Fig. 1 appears here] that the earth is loosened with a digging stick, and then the reed, which, by inserting the parts into each other, may be over a meter long, is sunk into the ground. As the accompanying figure shows, the Bushman does not keep the drainage reed and the sucking reed in his mouth simultaneously. The representations which suggest this might well be completely false; instead, the Bushman has the sucking reed in the right-hand corner of his mouth, and as soon as he has his mouth full of water he lets it flow into the closed hollow of his left hand in which the drainage reed is placed. The water gained in this way is of course thoroughly mixed with saliva. It cannot be kept for any length of time.

312
824 Water reservoirs are also provided by the few baobab trees, which contain puddles of water in their interiors. An artful method is used in the Sand Veld. A palm tree is drilled halfway up its trunk; then the palm pith is scraped out as far as possible, and the opening is carefully sealed. The water rising from the roots gathers in this hollow and has a good taste.

Among the thirst-quenching roots, that of a liana (!gôa) was named in particular.

[34 cont.]

312

224 ports:

Concerning other water-containing trees, F. Seiner re-

"The water-containing trees always have two or more trunks, and the source of the water is to be sought up where the branches fork. If the saddle formed where the branches separate shows a hole, a hollow area is traced in the adjoining part of the trunk, which may contain up to 60 liters of water. The water is obtained by tying, Bushman fashion, a small bundle of dry grass, or better still, a handkerchief, to the tip of a stick and inserting it in the hollow. When the stick is drawn out, the water drips



Fig. 1. !Kung at a Bushman Well.

from the saturated bundle or cloth, which is pressed out over a cup. [Fig. 2 appears here.]

[35] "The most important water roots are the

Asclepiadacea Fockea damarana Schltr. (ehoe), the Leguminosa

[532]

[224]



Fig. 2. //Gauab drives the game toward the hunters (from

[113]

Kühn and Obermann, Buschmannkunst [Bushman Art]).

[35 cont.]

312 Dolichos seineri Harms (eona), and the Convolvulacea Ipomoea
824 seineri Pilger (eawa); the enormous tubers of the latter two may weigh up to 150 kilograms. Considerably more important for the natives than these 'water roots' is the Curcubitacea Citrullus naudinianus Hook. (orura of the Herero; gab of the Hottentot); without their juicy gourds, which occur in great quantities and for the most part are edible, most of the central Kalahari would be impassable during the dry season, even for the Bushmen."

Further, F. Galton (1) reports:

[113]

1. F. Galton, Tropisches Südafrika, p. 101.

312 "In practice, the first hopeful sign when people are look-
825 ing around for water is a flight of guinea fowl; next, following the habits of the land, each tree is carefully examined until a parrot is sighted, an object visible even at a great distance because the bird likes to sit on the uppermost branches. A parrot is rarely more than half an hour away from water, and the same applies to baboons. If one proceeds with careful observation and takes a probable direction, he will see doves flying about; then little birds are found in all the bushes, and they are close to it."

10. The Veldkost

222 Just as //Gauab accompanies the hunter on the chase, he is
776 also the companion of the women who go to look for veldkost. If //Gauab takes delight in a woman, he will break the bones of an animal, killing it, and will lead the woman to it. If, however, //Gauab is angry at a woman and she finds no veldkost, then she becomes angry, gets up early in the morning, abuses //Gauab, and then takes medicine and washes her face so that //Gauab will not recognize her. Then she goes into the veld and finds something.

[782] //Gauab receives no offerings from the veldkost. The celebration
222 of the first fruits of the veld described by Vedder is no longer held.

[887] The oldest woman is brought to eat samples of each type of
veldkost that is brought home for the first time in the year. Then the second oldest woman takes a taste, and so on down the line.

FX10
NARON
Nogau

[77 cont.]

- 41) into the reed shaft while the other is poisoned. In other cases, the short arrowhead is joined to a bone spindle by means of a connecting piece made of grass, and this bone spindle is in turn fixed into the shaft so that the arrow is tripartite. The arrows are either carried in the quiver already assembled, or the points [78] are kept in small containers of bark or horn closed off at both ends by leather caps. Three bows of the Nogau had lengths [41] of 89, 95, and 100 centimeters. Animal tendons are used.

- [714] The battle insigne of the FX10 is a war cap made from the hide of the aardwolf. The bow of the Naron is made of Grevia 41) wood and is about a meter long. Not only tendons but also plant fibers are used for the bowstring. The plant strings are a surrogate that the Bushmen are forced to use today due to the lack of game. The bow itself is reinforced at the ends with a binding of tendons or leather.

- The arrow shafts resemble those of the FX10, as do the points. The iron points are not removable and are called male. The metal is obtained from the north and is worked cold by the [325] FX10. The Naron themselves make no iron arrowheads. [Fig. 28 appears here.]

- Whereas during Kaufmann's time the FX10 did not have the kirri, the Naron have it today; its lower end is sharpened to a point so that it can also be used as a digging stick. The Nogau, though not too commonly, have throwing clubs that [411] correspond to those of the Dama and Herero, but are more crudely worked.

Concerning the Naron, Bleek also mentions harpoons with long, composite shafts, which serve to get jumping hares and the like out of their holes. This tool will be described in greater detail under the Dama [untranslated].

- 372 Like all Bushmen, the Nogau make fire by rubbing two sticks together. The female stick is called Dane-di, the male Dane-go. Firemaking itself is designated as Dalisi, one of the many strange words without clicks that we find among the Nogau.

- 312 Bushman wells are likewise used and are called //a-si. The girls have a toy (gai-dum) consisting of several sticks of various kinds, which they wear on the chest. They drum on 524 IT WITH THE FINGERS.

[TEXT CONTINUES ON P. 155]

FAVIN
NARDON
NOGRO

[79 cont.]

- 224 water or Brak (salt) place and is prevented from turning off the track by thorn branches placed on either side of the worn track, steps on the little stick lying just below the ground, which moves it out of position and releases the end of the little transverse stick. The string, having lost its hold, releases the bent tree, which snapping back, tightens the noose around the leg of the game and holds the animal imprisoned until the Bushman brutally kills it with a number of blows of his kirri, which is carved out of hard
- 223 wood. For various kinds of fowl, doves, etc., the Bushman prepares similar slings with thinner string, which are set up in the same way except that the sling is not placed on the ground but is held two or three centimeters above the ground by means of little sticks planted in a circle. In the center of the circle, on a little stick loosely covered with sand, there are a few maize kernels or berries. When the bird picks them up, he moves the little stick out of position and finds his neck in the sling. -- As household
- 415 implements among the Kalahari Bushmen, in addition to the hollow
- 237 ostrich eggs used to carry water, I found water sacks made from the inner peritoneum of an animal, not unlike a pig's bladder; these water sacks are closed with a short stick and leather string.
- [312] The ostrich eggs also serve the Bushmen as artificial watering places in the dry stretches of the water-poor steppe regions, in which a number of them are hidden under the sand.
- 415 "Among the other household utensils of the Bushmen, I also found flat, wooden vessels, wooden mortars, and earthen pots of various sizes. The wooden vessels, which are completely different from those of the Herero, are, according to their own state-
- [439] ments, obtained in trade from their northern neighbors. The earthen pots likewise are not made by the Bushmen themselves. In form they are somewhat reminiscent of the wooden Omeira pots of the Herero and, as a Herero half-breed declared and demon-
- 600 strated to me, are manufactured in the following manner. A lump of soft and thoroughly kneaded clay is spread out over the naked, moistened knee, so that first of all it assumes the form of the knee. The calf of the leg must be pressed to the thigh in order to obtain the correct shape. Then the clay is carefully taken off, and the shape of the vessel is improved and perfected by kneading it with the fingers. Finally simple decorations are scratched into it with a

dangerous.' When they do they use the word *n/ol*. It is a word for gentle rain, and also a respect word. They use it for male rain when they are afraid of it and avoid its real name, *lga lgo*. [82]

The rains of the western Kalahari are local, falling from clouds which the winds herd. They may fill one pan and miss another. Laurence Marshall spent one whole night, tentless, in a drenching downpour, to find in the morning that a mile away no rain had fallen. But by and large the rains are sufficient in quantity and well enough dispersed to fill most of the water-holes, pans, and hollow trees, and to revive the growing things, so that the autumn months, which follow the rains, are good—the best of the year. Then the /Kung may travel anywhere within their territories to hunt and gather the fresh veldkos. The rains are life-giving. [32]

Winter is the season of dryness. It is also the season of burning sun in the cloudless sky by day and freezing cold when the sun sets. Bitter winds catch up the sparks of the fires at night and whirl them in blazing streaks into the darkness. If water is left in an open bowl, it may be ice in the morning. By mid-winter, July, there has been no rain for three or four months. The pans and small water-holes are dry. Though there are still foods to be gathered, like the mangetti nuts in the northern forest, there is no water on the route, nor in the white sand dunes where the mangettis grow, and the people cannot carry enough in their ostrich-egg shells to go to the mangettis and return. In 7,500 square miles of the interior of the region around Nyae Nyae, there are only five water-holes which do not dry up in the winter and spring. The /Kung bands must gather around whatever permanent water-hole they belong to and restrict their hunting and gathering trips to conform one way or another to the problem of water. This region, incidentally, does not abound in tsama melons and, though there are succulent so-called 'water' roots to be found, they seem not to be sufficient to support whole bands for long. The Nyae Nyae bands, it appears, cannot, or at least do not, base themselves for long periods away from their water-holes. [22] [36] [137]

The spring months which follow the dry months of winter are the dangerous months. The sun is scorching. Fruits and leaves shrivel; the edible roots, stirred by the few tantalizing drops of the little rains, or just because it is spring, give up their juices to the first new shoots and are dry and bitter to eat. The people longingly await the rains, saying it is the sun which dries the water-holes and the plant foods. The /Kung of this region use one word for both sun and dryness, */kam*, and say the sun is death-giving. [32]

In their beliefs about *n/ow*,¹ which they think influences the weather, as this paper will describe, they make an antithesis between rain and cold. This seems paradoxical when one experiences the devastating heat of the sun in September, October, and November, but the resolution of the paradox may lie in the fact that the hardships of the dry seasons begin with the rainless winter months and their bitterly cold nights, so that sun, dryness, cold and want become a complex which is in antithesis to rain and plenty. *N/ow* is called 'bad' if it brings cold, 'good' if it brings rain. [71] [92]

Mrs. Hoernlé² records a Hottentot belief called */nan*. The word appears to be

¹ We spell the /Kung word *n/ow* in this way because it rhymes with 'how'. We wish to distinguish it from another /Kung word, */nan*, which it closely resembles, but which has a slightly shorter, more closed sound. */Nan* means 'old man', according to

Miss Bleek's *Bushman Dictionary*. We heard it used as a term of respect in addressing old men. [26]

² Hoernlé, Agnes W., 'Certain Rites of Transition and the Conception of */nan* among the Hottentots', *Harvard African Studies*, ii (1918), pp. 71-77.

FOREWORD.

X137
312 The Kalahari is not a sandy desert in the sense that it is devoid of vegetation; it is the absence of surface water which makes the region such a hazard to human habitation. It is the last refuge of the Bushman. 151 Primitive though he is, he survived in this inhospitable environment owing to his acute powers of perception and his fine appreciation of the 224 gifts of nature. He is a skilled hunter with his bow and arrow and has an 823 intimate knowledge of the natural resources of food and water. Dr. Story 124 compliments him by saying that his knowledge was usually imparted cheerfully and with humour and "always with intelligence".

121 The Division of Botany was grateful to accept the invitation for Dr. Story to accompany the Harvard-Smithsonian-Peabody expedition of 1955. This was the fifth expedition of its kind and had as its objective the further documentation of the way of life of the Bushman. Dr. Story's assignment was to investigate the plants used by them in obtaining food and water.

It is inevitable that, with the advance of civilisation, the remnants of this interesting race will lose its intimate contact with nature and in the end its very identity. Wishing to complete their records before this happens the Harvard-Smithsonian-Peabody organisation, is, as we go to press, returning on yet another expedition. The Division of Botany is glad of this opportunity to continue the collection of data on the plants of economic importance to the Bushmen in the Kalahari.

The balance in nature between supply and demand is of endless interest to the ecologist. In times of plenty—when vegetation is abundant—the animal population increases: in times of poverty—when the vegetation is reduced by the prevailing climatic conditions—the animal population is reduced by the effects of hunger and thirst. So it is with the primitive human, who is dependent for his survival on the animal and plant life which surrounds him. Overpopulation at any time spells destruction for him at a later date. It is obvious too, that primitive man must have had a strong influence on the distribution and density of edible wild plants. Some will have become more widespread and others less numerous. More 121 and more examples of rare species among the tuberous rooted *Asclepiadaceae* have come to light during the botanical exploration of southern Africa. It is felt that the edibility of these and some other tuberous rooted plants, in a large measure, accounts for their sparse distribution.

Dr. Story's observations support this view, and many other interesting facts are recorded in his preliminary report on the vegetable aspect of the Bushman's diet.

R. A. Dyer,

Chief: Division of Botany and
Director of Botanical Survey.

Pretoria,

October, 1957.

INTRODUCTION.

Early in 1955 the Chief of the Union Government Division of Botany received a request through the British Museum for a botanist to accompany the Harvard-Smithsonian-Peabody expedition, which in the winter of that year was to make a study of the Bushmen of the Bechuanaland Protectorate and South West Africa. The duties of the botanist would be to investigate and report upon the plants used by the Bushmen in obtaining food and drink, and this task was assigned to me in my capacity as one of the Botanical Survey Officers of the Division of Botany.

I joined the expedition on 10th June at Molepolole, after it had been some weeks in the field, and we thereafter travelled along the route shown on the map, reaching Windhoek on 2nd September.

There were two main areas of study, one in the country south of Ghanzi and the other north of Ghanzi. The southern area, part of the Kalahari Desert, was remarkably uniform in every way. The surface was deep loose sand, gently undulating and with occasional shallow depressions of firm dark soil known as pans, which collect a little water after rain. We did not see a hill after leaving Molepolole until the Ghanzi area was reached, nor a stone, except for shelves of limestone in some of the pans. There was no permanent water in the 300 miles between Kudumalapshwe and the Ghanzi farms, but Khungwane waterhole and Khomodimo Pan had not yet dried up. Khungwane held one or two thousand gallons and Khomodimo contained a pond about thirty yards across and a foot or so deep. It provided a home, rather unexpectedly, for a coot (*Fulica cristata*) and a water-scorpion (one of the *Nepidae*). There are no records of the central Kalahari rainfall, but it would be between 18.5 and 19.6 inches, which are the mean annual figures for Ghanzi and Molepolole respectively. In spite of this low rainfall, and although we were there in the dry season, we found that the sand a few inches below the surface and down to at least three feet was damp enough to retain its form when squeezed in the hand. One specimen of a species of *Breviceps* was found in the sand, a small burrowing frog which does not swim or jump and which passes through its tadpole stage in a mass of frothy material which surrounds the eggs. The commonest animals were the rodents whose burrows and tracks were in thousands along our route. The game included gemsbok, springbok, hartebees, eland, blue wildebees, giraffe and smaller antelopes and hares. Of the carnivora, lions, leopards, wild dogs, jackals and hyaenas were present. Ostriches and bustards were seen and occasional small birds of various species, but birds were on the whole poorly represented. The vegetation was mainly grassland, usually about four feet tall and mixed with many shrubs a little taller. Trees were seldom absent for more than a few miles at a stretch, and were scattered to form a parkland or in belts thick enough to hamper the progress of our lorries through them.

The northern area was much more varied, with the undulations sometimes forming distinct rises and dales. Hills, however, were still absent, although there were occasional outcrops of limestone and other rock. The soils were for the most part fairly firm, but sandy nevertheless, and damp below the surface. From time to time we crossed zones of purer loose sand, slightly raised above the surrounding country and known as dunes. A number of permanent waterholes, groups of large pans and a rainfall estimated to be about 20 inches a year (Department of Transport 1953) made this area better watered than the Kalahari, and better wooded.

be eaten after boiling, "pulp, rind and all". Dinter (1912:21-22) says 262
also that the Bushmen use the heart of the palm as a green vegetable, and 114
that a sweet sap may be tapped from the upper part of the stem and [273]
fermented to make an alcoholic drink. He gives the yield of fruits from
one palm as between 20 and 50 kilograms (48 to 120 lb.). His reference
to the heart of the palm is obscure, but Chapman (1868:1:55-56), who is
more explicit, says that this is the core of the young trunk.

Aloe rubrolutea Schinz (5135).

Eastern !khû Bushman n|oru

This species was in full bloom in early August, and made a striking
show with its spikes of brick-red flowers. The plants formed rosettes of
leaves 12 inches across, producing a slender erect five-foot flowering stalk.
Among the hundreds of specimens seen there were none arborescent,
although elsewhere arborescent forms are common (Reynolds 1950: 328).
Those seen at Nama Pan were similar in habit to *Aloe zebrina*.

Aloe rubrolutea was seen only on the rocky outcrops near Nama Pan
and Gam, growing in patches of an acre or so, but it has a wide distribu-
tion extending from South West Africa through the Bechuanaland Protecto-
rate to the northern Transvaal and Portuguese East Africa.

The flowers are stripped off the flowering stalk and pounded to make a 252
spinach-like vegetable. Although the Bushmen said that they did not eat 262
the leaves, they were tasted raw and boiled and were found to be juicy
and not unpleasant, and to have no harmful effects. They would be a
good source of water in an emergency.

Aloe zebrina Bak. (4995).

!h3: Bushman.... !ganja
!ganakwe Bushman n|oru
!gikwe Bushman... n|uru
Naron Bushman... n|oru

The plant forms a rosette of rigid dark green leaves which have pale
transverse bands and numerous sharp teeth along the margins. It may
have a stem 30 centimetres long (Reynolds, 1950: 282), but those seen on
the expedition were stemless. The flowering stalks were three or four
feet high. The sap in the epidermis of the leaves is greenish-yellow. It

oozes out of the vessels fairly quickly if a leaf is cut across, and hardens
and changes colour on exposure to the air, becoming brown and glassy.
The bulk of the sap, which is in the inner part of the leaf, is colourless
and translucent, and does not ooze out if the leaf is cut.

Only one small clump of this *Aloe* was seen, on deep sand about 80
miles directly south-east of Ghanzi. It is, however, recorded from Angola
and South West Africa and across the continent to the east.

The Bushmen stated that the leaves were a good source of water. One 262
of these plants was sent to Pretoria and grew well in cultivation. On being 312
tested, the leaves proved extremely unpleasant, not because of any bad 824
taste but because their sap is in the form of a thick, revolting slime.
Boiling or roasting did nothing towards making them more palatable.
Either the Bushmen were confusing this *Aloe* with another species, or it

older leaves are marked at the base on the lower surface with narrow wavy black bands. Specimens were collected in sandy soil in open park-land near Nama Pan and flowered in Pretoria the following summer. The leaves and inflorescences, like those of the edible species, die back during the winter. 137x

Neither of the two species could be named in the National Herbarium, for the genus is not well documented and badly in need of revision.

Sansevieria scabrifolia Dinter (4951) Photograph 7.

!h5: Bushman.....	!xa-ji
!iganakwe Bushman...	!gwi:
!gikwe Bushman.....	!gwi:
Naron Bushman.....	!gwi:
Eastern !khū Bushman	!hwi:

A stemless plant with bunches of stiff, erect, strap-like leaves 10 inches long and a little less than an inch wide, concave on the front or upper surface and rounded on the back, and without a midrib. They rise at intervals of a foot or so, and in tufts of up to a dozen, from a brown-skinned horizontal rhizome three inches below the ground, and are light green mottled with dark green. They are tough and fibrous rather than succulent, which is the term that has been used to describe the leaves of closely allied species. The plants may occur singly but are more often massed in communities 20 to 50 yards across. Those sent to Pretoria for growing have never thrived and never flowered, nor were they seen flowering in the field, but it is known that the inflorescence is spike-like along a 12-inch flowering stalk, and that it consists of crowded usually off-white flowers half an inch across. Flowering seems to occur rather rarely and sporadically in the genus as a whole.

This species was widespread and fairly frequent north and south of Ghanzi. It was not found in the open grassland but always among trees and scrub, though not necessarily shaded by them.

The rhizome is a useful source of water. It has a crisp, white fibrous flesh which is juicy and, although slightly bitter, not unpleasant. There are several species of *Sansevieria* growing in cultivation in Pretoria all alike in habit, and all have been tested. There is no perceptible difference in the taste or juiciness of any of them. 312 824

The leaf fibres of the plant described are used by the Bushmen in making a string of surprisingly good quality. 283 824

Wallera nutans Kirk (5311) Photograph 8.

Eastern !khū Bushman t!ū

The plants are about six inches high, with a slender erect central stem bearing paired light green grass-like leaves, strongly keeled and somewhat fleshy and faintly crystalline on the surface. Both the stem and the keel of the leaves are sparsely covered with short soft spines. Three or four strongly scented nodding flowers are borne, superficially very like potato flowers. There is a firm round storage organ a few inches below the surface of the ground, slightly larger than a golf ball and the colour of a new potato. 137x

Pollichia campestris Ait. (4963, 5040) Photograph 15.

A small grey-green bush with much-branched slender soft stems, fairly compact when growing in the open but usually found as a semi-scrambler up to four feet high. The leaves arise in tufts of about three, the tufts being opposite each other and at intervals of anything up to an inch along the stem. They are lanceolate and usually under half an inch long. The plant bears what at first sight appear to be fleshy translucent fruits like small white or yellowish mulberries, but which are actually parts of the flowers.

This is a widespread plant throughout Africa, and was seen at intervals all along the route taken by the expedition.

The fleshy parts of the flowers are edible and sweet, with a queer earthy flavour, and are loosely attached so that they may be easily collected by pulling the stems through the hands. The plant, however, did not appear common enough to be of importance as a food. [262]

Boscia albitrunca (Burch.) Gilg and Benedict (4998, 5208) Photograph 16.

!h3: Bushman.....	*hun
!ganakwe Bushman...	n!su-ni
!gikwe Bushman.....	n!su-ni
Naron Bushman.....	n!su-ni
Eastern !khû Bushman	zâ

This is a rather variable tree, sometimes with erect branches and sometimes with a spreading crown, usually bearing many thin twigs with much dead wood among them. The bark is sometimes loose, dark and coarsely fissured and sometimes white and flaky. The species was also often seen in the form of a many-stemmed shrub about four feet high. It is evergreen, and did not seem to be at all affected by the heavy frosts that were experienced in the central Kalahari. The leaves arise singly or in bunches of four or five from small knobs on the twigs, and are leathery and about one inch long and a third as wide. Although the flowers are small and inconspicuous as individuals, they are borne in masses towards the tips of the twigs and make quite a show. In the Cape and the Transvaal at least the tree appears to be sporadic in its flowering. The fruits are borne on half-inch jointed stalks, and are half an inch in diameter, pale-skinned and translucent, with several large stones surrounded by a thin, watery pulp.

The tree was scattered evenly throughout the country from Molepolole to Ghanzi and Gautscha Pan, and has been recorded from the Cape Province northwards to the tropics. It occurred singly, occasionally in open communities, but it was never seen to form thickets.

The fruits are eaten by the Bushmen, but they do not make pleasant eating, for the pulp has a rather slimy texture and a sickly-sweet taste. [262]

Sim (1907: 123) refers to a meal which is prepared from the roots by drying and beating them. The resulting meal is then sifted to remove the fibres and may be made into a porridge. There are reports of gastrointestinal disturbances after the eating of *Boscia* roots, but the reports have not been confirmed, and Steyn (1934: 561) fed large quantities to a rabbit without ill effects. It is suspected that people are susceptible only when they are not accustomed to this food. The Bushmen were not asked about their use of the roots, and did not volunteer any information. [252]

The older trees are often hollow, and form natural reservoirs for rain water which is tapped by the Bushmen. (See *Adansonia*.) [114 124] 3120 824

- x137 *triloba* they are what is known as dorsifixed, that is they are fixed a little way up from the base so that the stipule is free at both ends. The flowers are the same size in the two species and have the same long stalk, but those of *Vigna triloba* are predominantly purple. They tend to open in the early morning and to close during the heat of the day.

Vigna triloba is reported from a variety of soils and is widespread through southern Africa, but it was not seen on the expedition until the Nama Pan area was reached.

- 262 [252] It has a finger-thick tap-root which is edible after boiling or roasting, although fibrous and slightly bitter. In mature plants it may extend downwards further than can conveniently be dug, but it is easily broken off. There appear to have been no previous records of its use as a food plant.

- x137 *Commiphora pyracanthoides* Engl. (5137) Photograph 23.

Eastern !kxǃ Bushman n/ǃo

A deciduous, rigid, twiggly two-foot shrub with spine-tipped twigs, branches that curve downwards, and a bark that is pale green and flaky on the older parts and grayish on the young twigs. The flowers are less than a quarter of an inch long and inconspicuous, and are borne in bunches on small knobs scattered along the twigs. Male and female flowers are on separate plants. The knobs also bear the leaves, which appear after the flowers and are glaucous, simple and finely serrate, and about three quarters of an inch long and half an inch wide. The fruits are "ovoid, about the size of a green pea, though reddish brown when ripe. When the fruits are ripe, the fleshy covering may be easily split apart in two halves exposing the black seed with a red aril covering it partly at the base and extending in four slender 'fingers', producing an intriguing pattern". (Codd, 1951:87.)

The species extends from South West Africa to the northern Transvaal, but was uncommon in the area round Nama Pan. One specimen collected there was grown in Pretoria. Leaves and flowers were obtained in the summer following, and from this material the determination was made possible.

- [262] The plant exudes an edible gum from injuries and is a useful source of water in an emergency, the water being in a sappy underground organ
824 which is like that of one of the following species of *Commiphora*, No. 4994. It is known as a water plant among the Bantu of the Transvaal as well.

- x137 *Commiphora* spp. (4994 edible, 5030 inedible).

4994

!h5: Bushman. d3a
!rikwe Bushman d3a
Naron Bushman !uri

5030

!gikwe Bushman !ana

Two species of *Commiphora* were collected in the Kalahari south of Ghanzi. They were completely deciduous rigid two-foot shrubs with many sharply-tipped twigs and a flaky bark. At first sight they were identical, and even close examination revealed no bigger difference than that one of them was a little more of a thicker than the other and slightly grayer. The Bushmen, however, stated emphatically that the grayish one

- [278] was poisonous and the other not. They said also that the grayish one WAS THE HOST OF THE INSECT WHICH THEY USE FOR
[825] MAKING THEIR ARROW POISON, AND THAT IT HAD HARDER ROOTS THAN THE OTHER.

was the host of the insect which they use for making their arrow poison. and that it had harder roots than the other. The fruits, flowers and leaves might have shown the difference clearly, but no trace of them could be found, and though plants were sent to the Transvaal for growing they failed to become established. 824

In spite of its unpromising appearance, the non-poisonous one is a useful source of water. This is in a sappy unbranched vertical underground part about an inch and a half thick. The Bushmen excavate down its length as deeply as they can reach, then break it off and withdraw it. They remove the thin outer skin and chew the remaining part, which is crisp and has a little tasteless sap. As a source of water it does not compare with the various species of Cucurbitaceae—weight for weight it contains far less, and the labour of digging it up is considerable. However, it must be a reliable standby when the Cucurbitaceae are not in fruit, and in the central Kalahari it is plentiful. In the southern part it is apparently absent, for it was not seen until 256 miles north-west of Molepolole. 312
824
[222]
[271]

Dichapetalum cymosum (Hook.) Engl. 5109, 5266, 5338 Photograph 24. 137X
Eastern Ikhu Bushman ma-1

This plant produces a number of slender erect woody stems up to 12 inches high, sparingly branched and often buried in the sand at the base. The leaves are four inches long, numerous, sessile, alternate, broader in the upper half where they are about one and a half inches across, and tapering at the base, with a stiff papery texture and with veins prominent above and below. They have a slight bloom on the upper surface and the younger leaves at least have a pair of narrow hairy stipules at the base. The younger parts of the plant are hairy, but the hairs wear off with age, and during the winter the leaves turn brown and hard and finally drop. The flowers are scented and have white petals forked at the end, but as they are small and nearly covered by the sepals, they are not conspicuous. The fruits are like a loquat, and may be brown or yellow. The have one or two big seeds covered by a little flesh.

Dichapetalum is distributed widely but patchily from the northern Transvaal through to Angola and Rhodesia. On the expedition it was seen for the first time between Tsau and Kaikai, and beyond that it was fairly frequent but scattered. It was usually in open situations, and seldom where there was dense tree growth.

Though the leaves are extremely poisonous, the flesh of the fruits is harmless and is eaten by the Bushmen. They emphasised that the flesh only could be used, and that the stone was poisonous. They did not mention the skin, but the following note on Schoenfelder's specimen 31, in the National Herbarium, indicates that it, too, is poisonous:— 262

"Fruits like small yellow oranges are eaten peeled in great quantities by the Kung Bushmen. When still green can be eaten after baking in hot ash. Used like fruit, fresh. The peel of the fruit is stamped and mixed with other food to poison stealing dogs (Diriko)." [252]
[278]
824

Marloth (1913-25: II: I: 120) and Engler (1912: 577) also refer to the edibility of the fruits.

There are four other plants of very similar appearance which could be confused with *Dichapetalum cymosum*, and although they were not collected on the expedition, their distribution does overlap. They are *Pachystigma pygmaeum*, *Pygmaeothamnus zeyheri*, *Parinari capense* and *Diospyros chamaethamnus*. The first two bear inedible fruits and may be 137X

x137 [262] distinguished by their having opposite leaves. The latter two bear edible fruits and like *Dichapetalum* have alternate leaves. The differences are that *Parinari capense* has leaves dark green above and covered with a white felt below, and that *Diospyros chamaethamnus* has no stipules.

Another species, *Dichapetalum venenatum*, has been described, but is in my opinion not specifically distinct from *Dichapetalum cymosum*.

Ricinodendron rautanenii Schinz (5336) Photograph 25.

Eastern Ikhū Bushman ,ik'a:

The trees seen on the expedition were about 25 feet high and were then (at the end of August) quite bare, resembling slender baobabs, with similar but thinner stems, and smooth bark and stubby branches. Specimens collected elsewhere showed that the leaves are digitately compound, with about five leaflets and two prominent green glands at the top of the leaf-stalk. They are dark green above and pale below and covered with a pale to brownish powdery wool which is found on the young twigs and fruits also. The trees are either male or female. The small creamy flowers are borne in bunches towards the tips of the twigs and the female flowers give rise to reddish fruits the size of a small plum, consisting of a thin pulp surrounding a very hard nut. This is light coloured like an almond, thick and strong and marked all over with numerous small pores.

The only trees seen were on heavy sand near the banks of the Eiseb omuramba, 29 miles from Gam on the way to Windhoek, where they were dominant in a belt several miles wide. They formed a woodland, with the trees spaced about 25 yards apart. Herbarium records show that this is the usual mode of occurrence. The species has been recorded from South West Africa, the Bechuanaland Protectorate, Rhodesia and Portuguese East Africa.

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262

The pulp of the fruit is edible raw or stewed. It does not readily go bad, but in time it dries and shrivels and in this condition, turned hard and crumbly, is still a wholesome food, edible raw or cooked. The stone contains one or two firm white-fleshed kernels which are, like the pulp, edible raw or cooked. The tree is an important source of Bushman food because of the quality and quantity of its fruit and because the fruits remain good for a long time even without being stored. Those seen on the expedition were on the ground beneath the trees and were still perfectly good to eat. The tree is additionally useful in that it sometimes collects and holds rain water in hollows in its trunk (see *Adansonia*).

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824

x137 *Sclerocarya caffra* Sond. (5292) Photograph 26.

Eastern Ikhū Bushman -gai

A few mature specimens were seen, about 20 feet high, and a few young ones. The mature trees had a single clean bole with a flaking bark and a branching rounded crown, and were very different in appearance from the young ones which consisted of four or five thick and sappy unbranched stems about five feet high, with a smooth brown bark. This was in August, and all were quite leafless. The following description is taken from Codd (1951):— "The leaves are pinnate with three or four pairs of well-spaced leaflets and a terminal leaflet. The leaflets are oval, smooth, tapering to an abrupt point and are about one and a half inches long and one inch wide. Flowers are inconspicuous and are produced in small sprays just before the appearance of the young leaves, some trees

Adansonia digitata L. Photograph 32.

Eastern !khu Bushman *m

The Baobab, as it is commonly called, is shown in photograph 32. Its stem may have a circumference of up to 148 feet, and makes it quite unmistakable. In winter it is leafless but in summer it bears dense dark-green foliage. The flowers are pure white and up to six inches across, and the fruits, as described by Codd (1951: 120) are "oblong or egg-shaped, five to six inches or more in length and three to four inches in diameter, with a woody shell which is softly grey-velvety on the outside".

The southernmost specimens were seen in the neighbourhood of Ghanzi, and from there it occurred sporadically to Gautscha Pan, the furthest point north reached by the expedition. There were big gaps in its distribution and it was rare throughout, but in some parts of the Transvaal it occurs abundantly and may have an unbroken distribution over many square miles of country. It is widely distributed in the drier regions of north and south tropical Africa.

Inside the shell of the fruit is a white, pith-like substance which may be eaten raw, or ground up and stirred into water to make a drink, or boiled to make a porridge. It has an acid-sweet taste. The seeds which are embedded in the flesh are also edible and are eaten like nuts. In other parts of Africa they are prepared in a somewhat involved way which includes protracted boiling, fermenting and drying. There are several records of the fact that the young leaves make quite a good substitute for spinach, but as the expedition was during the winter and as the trees are deciduous, I cannot say whether the Bushmen know of this, nor whether the trees we saw were of the glabrous variety which is the one used for spinach. No seedlings were seen. It is known that the white shoot from the germinating seed can be used as a substitute for asparagus, and that the tender root of the very young Baobab is also edible (Dalziel, 1937: 113). The trees are often hollow, and like *Boscia albitrunca* and *Ricinodendron rautenii* may act as reservoirs for rain water which can be used in times of scarcity. The Bushmen reach it by fitting hollow grass stalks end to end to form a tube, and sucking it out. A further product of the Baobab is a large caterpillar which feeds upon the leaves and which is an important article of food among the Natives of the northern Transvaal. It is recorded also from South West Africa, and is very likely known to and used by the Bushmen.

Ochna pulchra Hook. (5273) Photograph 33.

Eastern !khu Bushman li and te:

A semi-deciduous tree with a clean but usually rather twisted bole which is white to light gray and has a peeling bark. The branches are bent and rigid and the wood brittle. They bear glossy light green alternate leaves which are almost sessile and usually entire, rarely with a very finely toothed margin. The tree has an attractive appearance even in winter, and the young leaves add to this in the spring for they range from pale green to reddish-brown. The flowers are borne in early summer, in showy scented bunches. They have yellow petals and a green calyx, which persists after the petals have fallen and turns bright red. The fruits are hard and green when immature but turn fleshy and black as they ripen. There are usually two or three, the size and shape of small beans, attached to a fleshy red swelling in the centre of the flower. The leaves have been suspected of causing poisoning in stock, but tests carried out on mammals have so far been inconclusive. (Uys and Thomas 1952, Steyn, 1949: 125.)

137X

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[272]271
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137X

By the spring there may be nothing left to mark the position of the plant. 137X
How extraordinarily observant the Bushmen are was well shown when they 824
were asked if they could find a specimen and demonstrate its use. One
man guided the party for four miles across country featureless except
for clumps of trees to a spot where he knew of one growing. It was
found after a short search—nothing more than two or three small sticks
among the grasses, with the bark shredding into white silky fibres.

Raphionacme burkei is found from South West Africa through the 137X
Bechuanaland Protectorate into the northern Transvaal and the northern
Cape. Two specimens were seen in the central Kalahari, and the species
was determined from one of them which was sent to Pretoria for cultiva-
tion and flowered there in the following summer.

It is a well-known source of water among the Bushmen of the Kala- 271
hari. They extract the water from the storage organ by planing a pile 312●
of shavings off it with the edge of a split stick, and then squeezing the 824
shavings in the hand and allowing the water to run into the mouth. This
rather roundabout way of doing things appears to be without good reason,
because the flesh of the storage organ may be chewed without any ill
effect. It is firm and crisp, slightly fibrous, and faintly bitter.

Pentarrhinum insipidum E. Mey. (5171, 5191) Photograph 40. 137X

Eastern !khû Bushman n!o-fu and n'wa-fu

A leafy deciduous climber up to 10 feet high, and a vigorous grower
which may completely cover the host tree. It has freely branching lax
stems which are quite tough in spite of being only a matter of an eighth
of an inch in thickness. They are covered with a fine white down which is
just perceptible to the naked eye, and when broken they exude a little
milky juice, so little that it is easily overlooked. At intervals of about
five inches arise pairs of leaves, deeply cordate at the base, and with long
stalks. In the younger stages they are minutely hairy but they become
glabrous or nearly so as they grow older. The flowers rise in a group
on a three-inch slender stalk from between the leaves. They are brownish
with a yellow or white central portion, small and faintly scented. The
fruits are occasionally produced in pairs but are more usually solitary.
They are beaked, three inches long and half as wide, covered with blunt
prickles, longitudinally wrinkled and dull green.

At Nama Pan this was a frequent climber among the trees, and it is
widespread over southern Africa. It was not, however, seen in the country
south of Ghanzi.

At maturity the fruits are hard and woody and packed with the fine 262
silky hairs that form the pappus of the seeds, but when green they are 252
softer and may be eaten raw or cooked as a vegetable, and may be stored
for three weeks before they deteriorate. Their rather copious white latex
is quite harmless. They have a crisp texture when raw and a pleasant
flavour, nutty and faintly peppery. When boiled they are reminiscent of
Asparagus. When the seeds inside have turned brown the fruit will be
found too hard to make good eating. The leaves, too, may be eaten raw
as a salad, and are used that way by some Transvaal Natives, but the
Bushman method of preparation is to pound them to a pulp in a wooden
mortar.

Pentarrhinum insipidum grows well from seed and is a rapid producer 137X
of green material. It might be a useful fodder plant for domestic stock.

Y137 specific name, which means *polished*, refers to the shiny appearance of the corolla-lobes towards the base. The fruits, borne in pairs, are between a half and a quarter of an inch in thickness and six inches long, tapering at the end and containing numerous flattened seeds with a silky pappus.

Although it has a wide range across tropical and sub-tropical Africa, it is uncommon; and only one specimen was collected on the expedition, under the shelter of scrub at the edge of a rocky outcrop at Nama Pan.

The stems are edible raw or roasted, but have a bitter taste. They are sappy enough to be a useful source of water.

Caralluma knobelii (Phill.) Phill. (5094, 4914) Photograph 47.

!h5: Bushman.....	-#aberr
!ganakwe Bushman...	-da:daba
!gikwe Bushman.....	-da:daba
Naron Bushman.....	-da:daba
Eastern !khû Bushman	-da:daba

The plant consists of a number of stubby, succulent erect stems four inches in height and half an inch in diameter. They are glabrous and dull bluish-green, mottled faintly with a darker green and square in section, with four rows of sharp and fairly hard-tipped spines. They exude a clear greenish juice when cut. The flowers are white to greenish, with dark purple blotches and edged with sparse delicate knobbed hairs known as vibratile hairs because of the way they are moved about by even the gentlest breeze. The stems arise from underground runners which have the same form as the erect stems except that they are white, and more slender.

This species, which is known only from the Kalahari; was found in various places on deep sand between Molepolole and Ghanzi, but was nowhere common. It was in the shelter of trees and scrub, and was not seen in the open.

The whole plant is edible raw or roasted, but the underground portions are better than those above ground, which tend to become bitter. They have a peculiar smoky flavour which is not unpleasant, and their abundant juice makes them a useful source of water.

Stapelia kwebensis N. E. Br. (5140) Photograph 48.

Eastern !khû Bushman -da:daba

Similar in habit to *Caralluma knobelii*, but with dull green downy stems and rounded instead of sharp corners. The spines too are shorter and tipped with small erect leaves. It has dark brown flowers with slender lobes ridged on the upper surface and radiating out from a shallow central pit.

Only one specimen was collected on the expedition, on a rocky outcrop at Gam, but the species is widely distributed in South West Africa except in the extreme south and it is known from the northern Transvaal as well.

The stems are edible, raw or roasted.

Fockea sp. (5136, 5236).

Eastern !khû Bushman '!xwa:

One of the two specimens collected was in the open among rubble at the edge of a sheet of rock at Gam, a plant with fleshy stems 12 inches high, and the only one of its kind seen in that vicinity. The other specimen was growing with several more in stony scrub-covered ground near Gautscha Pan, and appeared similar except that the stems were thicker and were twining to a height of several feet among the other bushes. The

leaves drop during the winter, but a few were still to be seen, linear, paired, and about three inches long and half an inch wide, and there was one fruit, as long as the leaves and shaped like a small cigar. The stems rise from a brown-skinned underground storage organ which may be more than a foot in length and up to five inches in diameter. It is often oddly shaped if growing in rocky ground, as these all were, and has a rather spongy texture, a combination which makes it difficult to dig up without damage. Several were brought in at a Bushman encampment about 20 miles south-west of Nama Pan, but none of them were entire. The specimens I collected were lost in transit to Pretoria, and though they could be placed in the genus *Fockea* from what had been seen in the field, the species is unknown. 137X

The storage organ is eaten raw by the Bushmen. The flesh is white and rather flabby, with a faint but pleasant flavour of coconut ice. As well as being a food it is juicy enough to be a useful source of water. It could possibly be bred into a plant worth cultivating. [262] [312]

Ipomoea verbascoidea Choisy (5223, 5319) Photograph 49.

Eastern Ikho Bushman nloru

Tubers and seeds of this species failed to grow in cultivation in Pretoria. The notes which follow were made partly from herbarium specimens, for the plants were quite leafless when they were seen in the field in August. They were conspicuous in spite of their bareness, because of the small pure white masses of wool in which the seeds were embedded. These masses were scattered along numerous slender twigs that arose from a group of sturdy, cane-like stems, half an inch thick and eight feet long or more. The stems are scramblers, or, if no trees are at hand, lax and spreading. They exude a little milky juice when cut. The stalked leaves are simple, rounded, and up to four inches across, and bear in their axils single large purple flowers of the typical Convolvulaceous (morning glory) type. The plant is covered with a white wool except on the upper surface of the leaves, where it is sparsely hairy.

Two plants were seen on the expedition, both in the neighbourhood of Nama Pan, and both on sand and among fairly dense mixed scrub. There are records of the species from South West Africa, the Bechuanaland Protectorate and Angola.

A note on one of the herbarium specimens states that the fruits are edible, but this was not mentioned by the Bushmen. They did however state that the storage organs were used as a source of water. These are six inches below the soil, sometimes partly exposed and partly eaten by animals. They are firm and juicy, and those seen were the size of a football, with a white flesh and a dark brown skin. The water may be extracted by chewing the flesh or by pounding it and squeezing the pulp. [262] 312 [271]

Ipomoea sp. (5179) Photograph 50.

Eastern Ikho Bushman Igarube

A slender plant with three or four bluish-reen leaves up to three inches long, borne on a four-inch erect stalk and themselves erect, and deeply and narrowly lobed. There are usually three or four tubers to each plant. They are found at any depth down to nine inches, and are variously shaped but regular in outline, typically the size and shape of a large apple with a slight depression on top, where they are connected at intervals of 137X

The fruit, according to the label on one of the herbarium specimens, is "very poisonous", but there appears to be no satisfactory proof of this. The Bechuana state that the crimson pulp round the seeds is edible, and I ate it without any harmful effects. It is sweetish but has a rather unpleasant slimy texture. (137X) (262)

Citrullus naudinianus (Sond.) Hook. f. (4983, 4984, 5272) Photograph 56.

!h5: Bushman.....	!gan
!ganakwe Bushman...	gā:
!gikwe Bushman.....	gā:
Naron Bushman.....	gā:
Eastern !khū Bushman	tfa

This vine, commonly known as the Gemsbok komkommer, is a runner on the sand and not a climber. It has a tap-root the shape of a large carrot, which may be three inches or more in diameter at the top and three feet long, and which grows hard and woody with age. The younger roots are full of juice and intensely bitter, and cannot be eaten by human beings, although many showed signs of having been eaten by animals. The runners, which may reach a length of 30 feet, are stouter than those of the related *Cucumis hookeri* and No. 4895 (see page 50), and unlike them and those of *Citrullus vulgaris* are fairly frost-resistant. Many were still green during the heavy frosts experienced on the expedition, and were even putting out fresh leaves. They often have a zig-zag growth form and may root at the nodes. Apparently they die back after a few seasons, for live and dead runners were common. The leaves, borne on a one-inch or two-inch stalk, are dull green, lobed, very rough to the touch, and between two and four inches long. A stout slightly hooked tendril rises at the base of each leaf and is usually about as long as the leaf-stalk. The fruits vary in shape from ovoid to nearly spherical, and weigh about half a pound. The skin is covered with thick soft spines a quarter to half an inch long, and is pale yellow when the fruits are ripe. They can stand heavy frost without spoiling, and are eaten by many different animals.

The plant has been recorded from the sandy parts of the north-western Cape Province and Orange Free State, the Transvaal, the Bechuanaland Protectorate, South West Africa, Angola and Northern and Southern Rhodesia. On the expedition the runners were common between Molepolole and Ghanzi but the fruits, in tens or in hundreds, were in patches sometimes many miles apart. The plants were not found on the firmer "pan" soils and were much less common north of Ghanzi.

The fruits have a thin rind containing numerous flattened white seeds embedded in a green translucent jelly-like flesh which may be eaten raw or roasted and has a distinctive, slightly rank flavour. The pips and skin are often roasted separately and pounded to make an edible meal. As a source of water this plant comes next in importance to *Citrullus vulgaris*, but like *Citrullus vulgaris* (and *Cucumis hookeri*) it cannot be depended upon where there have not previously been adequate rains, for the water in its perennial tap-root is not in itself enough to produce a crop of fruit. (262) (252) (312)

Citrullus naudinianus has possibilities as a cultivated plant.

x137 *Citrullus vulgaris* Schrad. (4937, 4999) Photograph 57.

lh5: Bushman.....	dam
lganakwe Bushman...	n an
lgikwe Bushman.....	n an
Naron Bushman.....	n a-l
Eastern lkh0 Bushman	-t'a-ma

This plant, one of the melons and commonly known as the tsama, has stout six-foot vines half an inch in diameter at the base and a quarter of an inch at the tip. They are covered rather densely with light brown hairs, which turn white and stiff with age. The vines are usually prostrate, but occasionally festoon themselves over grasses and low shrubs with the help of small Y-shaped tendrils, curly at the tips. The leaves are borne on two-inch stalks and are hairy on the ribs, dull green, rough to the touch and deeply lobed. Each plant produces male and female flowers. They are an inch in diameter and pale yellow, and the fruits which follow are rounded and up to six inches in diameter and six and a half pounds in weight. As many as 34, of all sizes, have been counted on one plant. The rind, densely hairy when young but later quite smooth, is dark green mottled longitudinally with light green, and contains a crisp, juicy, tasteless white flesh in which numerous flattened brown seeds are embedded. The melons can endure heavy frosts without becoming spoilt, but the rest of the plant is very susceptible. The frosts, however, merely hastens its death for it is in any case an annual.

This melon is indigenous to south-west Asia and the warm dry regions throughout Africa. The water-melon is merely an improved variety of the same species, which has been known in Egypt and Babylonia since the beginning of history (Marloth, 1913-1925: III: II: 205). The tsama was widespread but patchy along the route of the expedition, and areas of abundant melon alternated with long stretches where it was not seen. It was not confined to the sand but grew also on the hard soil of the pans.

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[184]
[244]

The tsama is unquestionably the most important plant to the Bushmen in this part of the Kalahari. They are known to use it as their sole source of water for months on end and it is extremely doubtful whether they would be able to live permanently in the Kalahari without it. Its importance is shown by the fact that one group of Bushmen in the central Kalahari had a small patch of tsama which they had grown from seed, and the Bushmen are not as a rule agriculturalists. Nevertheless, the tsama is not an infallible standby, for the reasons given in the discussion on *Citrullus naudinianus*, and when the need arises the Bushmen can and must substitute more meagre but at the same time more reliable sources of water, for example from *Sansevieria scabrifolia*. When it is used for drinking-water the melon is opened at the top like an egg and the central portion cut out and eaten. The rest of the pulp is then mashed inside the rind with a stick to a watery mass which is half drunk and half eaten, the pips being put aside and later roasted and pounded (without being peeled) to make an edible meal. The melons are sometimes roasted before being eaten, which adds a little flavour, and they may be cut up and mixed with meat to form a stew, which is conveniently cooked in the rind itself. Although no bitter specimens of the tsama were found along the route of the expedition, they do occur. Their flesh is poisonous and unfit for human consumption, but their seeds are free of poison and edible after roasting.

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At some villages of Bakalahari (which are a Bantu tribe), the tsama is regularly cultivated. These and wild melons are collected and stored under shelter, and goats, horses, cattle and even dogs are kept with tsama as the main source of water. The livestock use the melon more economi-

The storage organs are firm but juicy and may be eaten raw or cooked. The flavour is pleasant, rather like that of a turnip, and if they are eaten raw they are a valuable source of water. They were an important article of food to the Bushmen we met in the central Kalahari, and the plant would be worth investigating with a view to cultivation after improvement through breeding.

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[252
312]

Coccinia rehmannii Cogn. (4954, 5029) Photograph 61.

137X

Ik5: Bushman.....	m@wajé:
Iganakwe Bushman...	ga:
Igikwe Bushman.....	ga:
Naron Bushman.....	ga:
Eastern Ikhu Bushman	ga:

A vine, climbing by means of tendrils to a height of six or eight feet, and bearing on half-inch petioles a dense growth of dark green leaves which are deeply and irregularly lobed and very variable in size and shape. They have a rough texture from minute scattered white hairs, more numerous on the upper surface and pointing forward. The stems are slender and angled, and bear a few of these hairs also. The plants are either male or female, and both male and female flowers are trumpet-shaped with short triangular petals, pale yellow and three quarters of an inch across. The fruits are three quarters of an inch long, with a bulbous base and a rather thick neck, green mottled with white when immature and red when they ripen in the autumn. The old stems die back during the winter and new ones are produced the following spring from a perennial tuber buried about four inches below the surface of the ground. The tuber tapers gradually when young, but thickens and assumes various shapes as it grows older, and the bark, from being smooth, becomes rough and fissured. It does not "bleed" if injured superficially, but from deep injuries it exudes a clear astringent mucilage.

Specimens on the expedition were found not in the open grasslands, but always growing in shelter under a bush or in a thicket. It was mid-winter and they were dormant, represented above ground by a few fragments of dry and leafless stringy stem among the twigs of the sheltering tree, and in consequence exceedingly difficult to find. Even after the presence of the plant had been established the finding of the tuber-presented difficulties, for the connection with the vine overhead was often broken. The plant appeared to be occasional but widespread in the parts through which we travelled, and three tubers, all of which were successfully cultivated in Pretoria, were collected in different parts of the Kalahari. It is recorded also from the Cape Province, the Transvaal and South West Africa.

Besides providing food, the tubers are sappy enough to be a useful source of water, but they must be roasted first for they cannot be eaten raw. Older woodier tubers are best boiled, but even so the fibre is so tough that it is ejected after being chewed. At all stages the tubers are rather tasteless. They are known also to the Natives in some parts of the Transvaal, and eaten by them, but in this land of relative plenty they are not a popular food. The fruits also are edible, but rather sickly sweet and flavourless. Doubtless they are used by the Bushmen, but I failed to ask them.

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312

1 [CUCUMIS; see CATEGORY 116, P. 50 FOR DESCRIPTION
-ANALYST]

- 622 At the head of each group is a big man or chief. Though usually considered to be a chief in name only and without any authority over the members of the group, he in fact does exercise considerable influence in the life of the community because in him are vested certain functions, the performance of which are of vital importance to the welfare of his people.
- [423] The family area with its food and water supply, as well as the fire, are all looked upon as belonging to him. Among the tribes of the Kalahari he is succeeded by a son or, failing such, by the nearest male relative.) Among the *Hei-//om*, on the other hand, the eldest sister's eldest son succeeds to the chieftainship. Marriage in the group being exogamous and patrilocal, the rest of the group consists of male relatives of the chief with their wives and families. The whole group lives in a common werft or encampment which is laid out on a definite plan. The huts of the married families are placed about 15 to 20 feet apart and arranged in the form of an irregular circle 60 to 80 yards in diameter. Among the [184] *Hei-//om* the hut of the chief is always placed in the east, facing, but at some distance away from, the others. In the Kalahari it may occupy any part of the circle. At or near the middle of the werft is situated a large tree which is reserved as the meeting place for the men and for ceremonial and other purposes. Among some tribes women are entirely forbidden to approach it or to join the men when gathered underneath it. Within the circle adolescent young girls and [582] boys are accommodated in separate huts some distance away [342] from each other. Among the more primitive groups the boys are not provided with a hut, but sleep under the tree in the centre. Mature nubile young women either remain in the young girls' hut or occupy huts next to those of their parents, but inside the circle. Old widows and widowers, as also [589] visitors, live outside the circle of the married people. The dancing place is situated within the circle.
- 184 Huts vary considerably in size and shape among the various [342] tribes. In its most primitive form the hut is four to five feet in height and of very simple design, consisting merely of a semi-circular shelter of branches planted into the ground and covered with grass. Hut-making is the work of women, and a [462] husband does not interfere with his wife's building operations. When it becomes necessary to desert an old camp and establish a new one the site for the latter is selected by the chief, who [166] deposits his household and other effects on the place on which [342] his own hut is to be erected. After the other members have [622] done likewise he proceeds to light a new fire by means of firesticks. Brands from the fire of the old werft may not be used for this purpose. From the fire kindled by him each family then lights its own, after which the women may begin with the building of the huts.
- 361 In each group area the permanent encampment is situated [312] in the vicinity of the main water supply. When the area is of considerable extent the group, however, moves about from one place to another according to the season and the

609 bush beside her fireplace. Also, she brought out six round
 222 green melons which are called *tsama* melons, and which,
 during the autumn, provide the only liquid available for all
 the Bushmen in the desert, and for all the game antelope be-
 sides. Under the green rind a *tsama* is very like a watermelon,
 filled with small oval seeds and very watery in texture, but is
 itself pale green and smaller, the size of a small cantaloupe.

[271] Tsetchwe placed one between her feet and, gripping it firmly
 312 with her strong toes, chopped a hole in the top of it with her
 digging-stick; then, lifting the cap away like the lid of a jack-
 271 o'-lantern, she mashed the pulp inside until it was liquid. She
 put the melon to her mouth and, tipping her head back,
 drank from it, using her long digging-stick to help push the
 pulp into her mouth, working it like an enormous chopstick,
 making a watery noise as she sucked. When Tsetchwe had
 collected a mouthful of seeds she put the melon down, took
 an old, dry *tsama* melon rind from her kaross, and spat the
 seeds into it to save them, for they can be roasted and eaten
 like nuts when they are dry. Tsetchwe drank all the liquid in
 [264] the rind and seemed refreshed as she cast the empty rind
 over her shoulder and brushed off her mouth and hands.

609 At last Gai strode back into the werf, followed at a distance
 621 by a group of three small boys and, much farther, by three old
 women who stood waist-deep in bushes, close together like
 three antelope, craning their necks to see us.

609 When they noticed Tsetchwe and Ukwane, they came for-
 276 ward with more confidence, accepted tobacco, and, squatting
 621 immediately, began to smoke. It had been months, Ukwane
 said, since they had used their last tobacco, had been reduced
 to smoking leaves, and they were very happy to have the to-
 bacco we had give them. Bushmen love to smoke. They say
 [261] that tobacco, as well as the wild beans, takes away hunger
 and thirst, and, besides that, it makes their hearts glad. One

133 open and tilting, but the low hills and the forests veiled the great sweep of country, and the sun, the moon, and the horizon.

105 As soon as we were there we felt very familiar, very at
184 home. We knew quite a lot about Kung Bushmen, who in ways are different from Gikwe Bushmen—as the country is not as harsh, the Kung are a little grander, living together in larger numbers because they have veld food more abundantly, a little more extravagant with their time and their possessions. They build themselves grass huts or scherms, at least during the rains, and though they know vast sections of their country perfectly, being quite sure of the whereabouts of game and certain of the whereabouts of different types of veld food, they do not have to memorize the whereabouts of each root individually and store this information in their minds for future seasons, as the Gikwe do. The Kung are diligent and powerful hunters, although in some respects their country is harder to hunt in than the land of the Gikwe, more overgrown with brush and trees. But the Kung have metal-tipped arrows and complicated poison, and the men make a point of hunting often and well because their people love meat.

- 312 We knew their rolling veld with its baobab trees and hidden waters, for in Nyae Nyae the people do not have to scrape roots and suck melons, but are the possessors of deep water-holes where they can drink clear water almost all year long. We knew which stalks among the grass blades marked edible roots, and where game antelope might be found.

823 We knew not only the veld but the beings that live in the
776 sky above it, and knew the beings under the earth and in the four directions. We knew where the great god lives in the east with his tree and his medicine smoke with which he makes spirits of the dead from dead people. We knew his names, for

821 said to be ant lions which at night rise from the bottoms of their little traps of sand.

132 Since we had lived a year in Nyae Nyae we knew the round
821 of the seasons, which Kung Bushmen say are six in number.

We came there in July, in winter and the start of the drought, the coldest season. August was bitterly cold and also dry, but in September the air began to get warmer and heralded the next season, called "little winds before the rain," a season of whirlwinds, drought, and clouds of dust. In October, suddenly and presenting a startling sight, a thorn tree near our camp turned quite green and the heat began to be intense. This was the start of the springtime, the driest, hottest time of all the year and a time of starvation, for the water in the waterholes gets very low until only a little remains on the bottoms and the wild roots push sap into their vines so that the vines turn green and sprout but the roots themselves are shriveled. This was the worst season of the year for the people. Before this, during the winter, the large extended band that we had gone to visit was separated into little family groups that were scattered through the veld, living at little waterholes that did not keep their water all year long. During the dry season the water in these waterholes vanished, causing the small family bands to gather at the last sure waterhole of the area, a waterhole called Gautscha, which was beside a huge flat pan called Gautscha Pan.

There was one rather large band that always lived at Gautscha and numbered some forty people, who divided themselves into sometimes three, sometimes four family groups. They thought themselves lucky to live there, for Gautscha was considered to be a sort of paradise, where the waterhole was cool and deep, and (it was said) game gathered at all times to lick the salt, for Gautscha was a salt pan. It was the salt that made Gautscha most desirable, because salt is

Peoples of the Veld and Sky

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green-leafed vegetables, and sometimes many of the people³⁶¹ of the large extended bands come together to live, to hold⁶²¹ important ceremonies which require many people, and to enjoy each other's company. Sometimes they separate into very small bands because they can now go anywhere they wish, each family going to the part of the veld where the type of food grows that the family most enjoys. There is water every³¹² ● where, in small seasonal waterholes, in shallow salt pans, in hollow trees, and the people thrive and grow quite fat. One of their favorite foods, one that grows in great abundance at²²²₂₆₂ this season, is a ground nut called *tsi*, which grows on a trailing vine and is so fat that if you leave a kernel of it on a piece of paper it will leave a greasy stain. *Tsi* is regarded by the Kung Bushmen as a very powerful food, one of the powerful veld foods in which there is a special essence, some^[778] thing mysterious and magic which gives them a life force all their own so that it would be dangerous to eat them during the year if this life force were not first subdued or not first integrated with the life force of the people. These foods are⁷⁷⁸ the mainstays of the Bushmen's diet, and are fat; and every⁷⁸⁹ year people in their child-bearing years, when they consider themselves subject to harm, protect themselves against these foods by a ritual act.

The act of protection is called *choa*, and it is interesting because it differs from the protective rituals performed by agricultural peoples to save their crops or animals from harm, or to cause their increase. The Bushmen *choa* themselves not^[842] to protect their fertility, for decrease in the number of children is not a problem to them, but to make sure that they, the young adults and mainstays of the community, will not get thin and starve.

Those whom Bushmen call "old people," adults who have⁷⁸⁹₈₈₅ had three children, are expected to protect themselves and also to protect young people of the same sex.

Toma the Leader

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The water was darker now and roiled, and the stench was ²²² stronger. We went on after the Bushman women to find gum in the trees and then went home, and after that I had not been back to Nama.

Since then, the heavy rains had come three times, filling ³¹² the waterhole and the lake and washing away the putrescence, leaving only the white bones sunk in the bottom of the well. Now the water of the lake seemed very pure indeed, with the ripples that the wind made shining like mica in the sun, and so clear that we could see every blade of grass and ice-cold stone on the bottom. Lazy Kwi and his family climbed ^[271] down from the truck and squatted at the edge of the water to drink, scooping up water in their cupped hands. As they drank, Lazy Kwi found some Bushman footprints on the little shore which were many days old, just dents in the hard sand, but after glancing at them once or twice he said they were the footprints of strangers, a man barefoot, a woman in sandals, and a barefoot child, on their way to a place called Naru Ni, somewhere in the west. I don't know how he could tell all this, but I believe that he was right. Bushmen are always right when it comes to tracks, but also it is very unusual for Bushmen to travel through country that is not theirs, as these three must have been doing or Lazy Kwi would have known them. Naturally, we were very curious to know who they were and what they were doing, but their footprints told Lazy Kwi no more than that, and we never learned.

These were the only footprints that we found, but Lazy Kwi still believed that some of the people we had known at Gautscha in 1953 might be living there, especially Toma, the headman, for he had been there when Lazy Kwi had heard of him last.

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II: Marshall E-5 (1950-1955) 1958

FX10 Bushmen FX10
Kung



WATER IS KEY to life in the Kalahari: only ten permanent waterholes. Above, in all the !Kung territory, there are a man fills his ostrich-egg "bottle."

[p. 21]

U: Marshall E-5 (1950-1955) 1958 FX10 Bushmen FX10
Kung

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For the rest of the year, above, they fill their eggshells from permanent waterholes, dig for water roots.

[p. 22]

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BAGS FOR FOOD, above, like eggshells for water, give !Kung some freedom in

moving. Food may be brought to water or water carried far into the desert.

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poison-bearer, its cycle is somewhat as follows: the beetle lays its eggs in the Murula tree leaves. Hatching in the rains, the grubs migrate down the trunk, progressing through a number of growth stages. Finally, they make their cocoons under the ground near the tree. In these cocoons, they struggle through metamorphosis and emerge as small, bravely-colored beetles in the New Year's rains, providing the Bushmen have not already dug them up. The hunters know the particular trees frequented by the beetles and make expeditions to them at least twice a year to replenish their supply. Then the grubs are dug up, and used on the spot or kept in their cocoons, depending on the man's needs.

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The poisoning of !Kung arrows is a long process, with a number of variations. The most common poison is a mixture of the grub and the previously mentioned tree-pod. The grubs are crushed and the pod is warmed until its contents melt slightly and can be crushed with the grubs. This mixture is thinned with the copious spit which results from chewing any of a variety of barks and is then smeared on the foreshaft of the arrow—but cleaned immaculately off

- 312 **T**EN permanent waterholes, as we have seen, occur in two areas—around the ring of pans in the east center of *Nyae Nyae*, and along the eastern border. To the west, beyond the limit of the pans, there is no water in the long dry seasons. Around each permanent waterhole, the *veldkos* near enough to be gathered in a day are considered by the !Kung to be an integral part of that waterhole. This means that such a waterhole includes both the water itself and all the *veldkos* within a circle with a radius of some four miles. This area might be called a certain waterhole's "district," taking its name from the waterhole. When a man mentions a waterhole, he usually has such a district in mind.

222 Yet neither the *veldkos* in these
484 districts nor the *veldkos* scattered between the districts, nor the game, which wanders, constitute the main

[p. 59]

622 areas, baobab trees, and—most im-
 423 portant—*mangetti* trees that hold
 water in their trunks, and *tsi* areas.
 It is these "owned" features, and
 the direction from the waterhole in
 which they lie, that define a terri-
 tory. Since, as we have seen, *man-*
getti's and *tsi* are the most important
 !Kung resources, they are the main
 determinants of a direction.

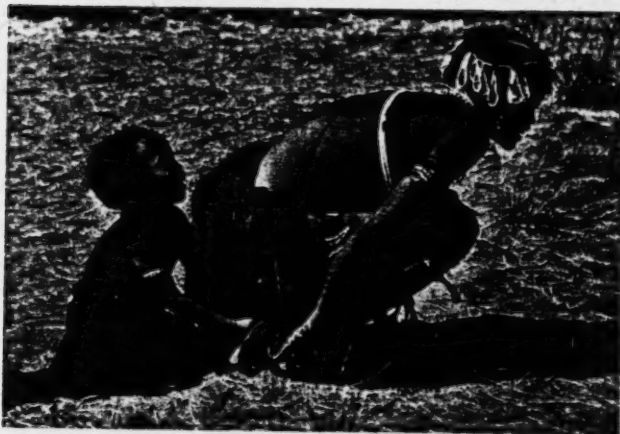
But animals are *not* owned. Neatly
 bounded sections of the countryside
 are *not* owned. A territory, therefore
 can best be defined as the combina-
 tion of a permanent waterhole and
 a direction: the !Kung so define it
 by the word "side." One headman's
 territory is said to be on this "side."

361 JUST as the Kalahari's scant re-
 621 sources of food and water are dis-
 tributed in accordance with a geo-
 622 graphical pattern, the !Kung bands
 are distributed in accordance with
 both a geographical and a social pat-
 tern. Natural resources are the focal
 points in the geographical pattern
 of band distribution; headmen are
 the focal points in the social pattern.
 In a sense, headmen tie together the
 two patterns, the concept of head-
 manship being the embodiment of a
 certain quantity of resources in a
 person around whom a band can take
 shape and operate. Because of their
 kin ties with a headman, the people
 living round him, clustering their
skerms around his and moving with
 him over his territory, feel right in
 being where they are.

622 The headman receives no special
 554 privileges. He is no more wealthy
 than other men. If he is a leader, he
 may assume responsibility and speak
 out. But, as headman, he need not
 speak, for headmanship is a silent
 office and while the headman lives—
 by his waterhole or out somewhere on
 his territory with his band—he serves
 his whole purpose.

423 Most of the permanent waterholes
 312 have two !Kung bands associated
 with them, and the *tsi* areas are like-
 wise shared by bands from the same
 and different waterholes. Such shar-
 ing may come about because two
 brothers (only one of whom may be
 the true headman) live together and
 feel they possess joint claims. It may
 come about through the passage of
 time, which confuses genealogies and
 lets claims, once tenuous, become
 firm through usage. The !Kung are
 a people of present tense, living—in
 their minds as well as with their

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HAPPY LIFE of children includes such moments as these: a laughing game of

"pull-away," above.

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bodies—from day to day. If the water-holes were not shared, some bands would be without permanent water.

Not all !Kung territories are of equal value in terms of food and water. Some people have *mangetti* nuts, some have *isi*, and some have both. There is mild wealth, and gentle poverty in *Nyae Nyae*. Territories also change in value year by year. The rains may fail in some parts of *Nyae Nyae*, and fall in others. In normal years, *mangetti*'s in the north may become available earlier in the season than those of the western forests. Because of the flexibility of band composition, the bands gathering *mangetti*'s in such a favored area are enlarged by people who would otherwise have to wait.

This is usually a temporary situation, the newcomers having more the status of guests than members of the bands. Often, whole bands—headman and all—will visit him in this manner. During years of desiccation, the fact that a person has several choices of bands in which to live becomes vital to him—he can move from a hopeless place to perhaps a better one.

By such means, balance works out between the desert's resources and the numbers and distribution of !Kung who exploit them. No one district or *mangetti* forest could support more than a limited number of people. Only certain people possess the necessary kinship qualifications to join a band. The flexibility of their

[P 87]

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A lack of permanent water is probably the most trying of the difficulties which beset the Bushmen of the present day in the country which shelters them. However, it is this very disadvantage which has ensured their survival, for while they have been dispossessed of their country and exterminated in the less arid parts, in the "Great Thirst Land of the Kalahari" they have been comparatively safe from their European and Bantu enemies. The austerity and hardships of the Kalahari are offset to some extent by its deep level mantle of sand, which prevents run-off of the rainwater and makes it readily available for plant growth. "Clay, for example, is as dry as dust to the plant when it contains 18% of water, while most sands are very nearly saturated with 18% of water" (Schantz 1911). This means not only that the sandy soil can support more luxuriant plants in greater variety, but also that storage organs are common among them, for drainage in sand is so rapid and thorough that shallow-rooted plants at least are in a stronger position if they are able to collect and store the water before it sinks into the deeper layers.

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Although some of the storage organs are poisonous, the Bushmen still have numerous edible bulbs, tubers and roots at their disposal. Thanks again to the sand, they can harvest these quickly and easily with wooden digging-sticks which would be inadequate in a heavy or stony soil. Other storage organs which they do not eat because of bitterness or high tannin or fibre content are nevertheless important indirectly through being eaten by the various antelopes that are the Bushmen's meat supply.

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Hunting is easier as well, for as there could be few better tracking surfaces than the Kalahari sand and, as a wounded animal can thus be followed with very little risk of loss, hard-hitting weapons and careful aim are not necessary. Instead, the Bushmen use small poisoned arrows which have the advantage of being effective on any part of the body and of bringing death as certainly to big game as to small.

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LINGUISTIC AND BAND GROUPINGS • The major groupings among the Bushmen cannot correctly be called tribes; they are, rather, linguistic groupings and the names by which they have been traditionally known by Europeans refer to language: for example, !Kung-speaking Bushmen, Naron-speaking Bushmen. The Bushmen themselves and their Bantu neighbors use a multitude of names by which they refer to various combinations of local groupings. Our own tentative and incomplete comparisons lead us to say that the language groups differ from one another markedly in some customs while they are much the same in others.

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The language groups have no political unity among or within themselves. The only social unit larger than the family is the autonomous band composed of several families and headed by a headman (see "Political Organization," p. 267). Each of the major groupings has many bands within it.

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The Bushmen whose social structure I describe in this chapter are a group of !Kung-speakers who call themselves *ju /dassi* and who live in the Nyae Nyae region of South West Africa. It is a region of about 10,000

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The poisoned arrows of the Bushmen are as deadly 628
to man as to game and they are always at hand. A mere nick and a speck of 721
poison in the bloodstream can be fatal. There are no known antidotes. 411

As skilled trackers of game, Bushmen develop their powers of visual ob- 151
servation and train their visual memories to such a high degree that they
know everyone's footprint as well as his face. This is another deterrent, for
no one could steal veldkos without leaving his marks and having his identity
detected. Theoretically, in !Kung society the thief may rightfully be killed by 185
the person or the band from whom he has stolen, but he may fight back, and
relatives could also become involved and the fighting would spread. In the
opinion of the !Kung, situations likely to engender hostility are assiduously to
be avoided, to say nothing of actual fighting. Breaches of this intention are
very rare.

Life throughout the seasons is planned around the veldkos gathering. 221
The people know at what seasons the various veldkos will ripen and about 222
how much each patch will yield if the rains have been good or if they have 182
been poor. The !Kung are not, according to our way of thinking, exactly con-
servation-minded, but they do plan to consume their veldkos in advantageous
order. They eat the perishable short-seasoned leaves and the few fruits as 262
soon as they ripen. They leave until the dry season is advanced certain beds
of roots and tubers that are edible the year around if they remain in the
ground.

The headman of the band has the authority and the duty, according to 622
!Kung social regulations, to plan the band's movements, to say to which 222
veldkos area they will go and when, and, if the band separates temporarily
into segments, to know where each segment is going and, in general, what
veldkos it will consume. It is a matter of life and death to plan and control
as best they can and not to travel for days, counting on food and finding that
one segment of the band has eaten it all, unbeknown to the others.

Each type of veldkos and each area presents its problems of logistics. 222
water being the determining factor in the plans, for usually water and 312
veldkos are not in the same place. During the big rains and for several weeks 221
after, the pans and vleys become shallow ponds and small, temporary water
holes are filled. It is the time of relative plenty. The people find sufficient
water to enable them to move about with comparative freedom in their coun-
try, wherever there is something to gather. When the dry season sets in, 415
the problem is to carry enough water from the water hole to the veldkos area 237
in ostrich egg shell containers and to carry enough veldkos back to the water
hole. It is a ceaseless labor.

The distances the !Kung travel between water and fertile areas in these 624
gathering trips vary from a few miles to twenty or thirty. The people do not
manage greater distances except in the rainy season, when they go as far as
seventy-five miles to a mangetti forest.

When the people go to gather mangettis or tsf, the men always ac-

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in several different bands, and they may choose among them. A band that owned comparatively good resources would tend to attract more members than a band with scant veldkos. This flexibility of residence pattern is one of the reasons that one finds the bands of the interior of the Nyae Nyae region relatively in balance with their resources, and varying in size.

WATER • Two or more bands may share the ownership of a water hole. Water holes keep their own rough population balance because, if water is very scarce, people will go to live elsewhere when they have the possibility of doing so.

In the interior of this region, in roughly 8000 square miles, there are three water holes that can be called really permanent. In the driest years these do not fail. Four others dry up only in years of severe drought. Six more are semipermanent: in a very good year they may yield a little water right through, but in a dry year they are sure to dry up. When the semipermanent water holes go dry, the bands who own them may break up temporarily and the families may go to live with relatives who are at permanent water holes, or they may go as whole bands to another water hole where they have relatives.

Water is not owned as exclusively or as jealously as veldkos. Water seems to belong more to mankind, as the animals do, and the ownership of water holes emphasizes more the managing than the withholding of the water. The headman controls the water. His permission should be asked by travelers or visitors before taking water, "because he knows what he has and what can be done," we were told. We saw small temporary water holes marked with bundles of grass thrust into forked sticks. This was to tell visitors or travelers that the owners of the water hole were in residence, as it were, and were counting on the water. We believe that in these circumstances water would not be taken without permission. Occasions are not likely to arise where permission need be refused. The !Kung know where the others are, or are likely to be, at a given time and know how much water is available. They plan better than to get themselves into desperate situations.

One source of water appears to be owned by individuals. It is the rain-water that collects in hollow mangetti trees. The water in trees is not stolen by others who go to gather in the same mangetti forest. Water, incidentally, is the only beverage of the !Kung in the interior of the region. They have no alcoholic drinks and use no infusions of herbs.

HUNTING AND MEAT SHARING • !Kung hunting regulations do not confine the hunters to territories. The game animals belong to no one until they are shot, and the hunters may follow them anywhere the spoor leads and may cross the territorial boundaries of any band. If hunters have made a kill in the territory of a neighboring band, they would not fail to give a present of

121 (George Silberbauer) was already conducting research among the Bushmen of the Central Kalahari Game Reserve.

After DeVore's return to Harvard in September, the author surveyed the Ngamiland situation and found that the Bushman population in the northwestern sector satisfied our research requirements.

161
• 312 In October, 1963, there were about 430 Bushmen living at
621 nine waterholes in the !Kangwa administrative district. Over
224 70% of these people were organized into bands and depended on
222 hunting and gathering for their subsistence. Although some
648 340 Bantu lived in the district they had not established a
lord-client relationship over the Bushmen. This feudal type
of social system exists elsewhere in the Kalahari but not in
114 the !Kangwa district. The author was the first white person
to live in the district. The Marshall expeditions had touched
the western edge of the district but had centered their re-
search at /Gautscha, a camp about 40 miles west of our area.

The main field station was set up at Dobe, a small water-
hole in Bechuanaland, two miles east of the Bechuanaland -
South West Africa border. The author conducted research here
for twelve months, except for intervals of work elsewhere in
the Kalahari and study periods in Livingstone, Johannesburg,
Windhoek and Capetown.

In October, 1964, Irven and Nancy DeVore joined the author

[TEXT CONTINUED ON PAGE 6]

162 working on farms. Many of the Pandamatenga Bushmen work in
131 Victoria Falls and Livingstone. Some have gone as far afield
464 as Lusaka and Salisbury looking for work. The Kwengo Bushmen
648 of Barotseland no longer maintain a hunting way of life.
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(Clark, personal communication). Their numbers are estimated
at 200.

161 This tally of Bushmen hunter-gatherers gives a total of
162 9,300 against an overall total of 44,100 Bushmen. Twenty
224 percent of the Bushmen hunting full time seems a much more
222 reasonable proportion than Tobias' 64 percent. It is unlikely
[114] that a change of such magnitude could have occurred between
the date of his census (1956) and the present one (1964).

162 The figure of 9,300 is nevertheless quite substantial
224 and indicates the remarkable persistence of the hunting-
222 gathering way of life in spite of the fact that even the most
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isolated of the hunting tribes maintain close contact with
184 their European and Bantu neighbors. A large proportion of
[221] the /Gwi Bushmen of the Central Kalahari Game Reserve spend
[648] part of the dry season squatting on European farms adjacent

• [312] to their area. In the north the hunting !Kung often share
[464] their waterholes with Bantu cattle herders. Most of the
[233] young !Kung men spend a year or more working as cattle herds
on a contract basis.

000 As far as is known, all Bushmen hunting today have had

[131]
[131] this area is waterless and uninhabited. In the center is a
• [312] ring of pans and a series of waterholes which support at
[133] present a population of 1,200 !Kung Bushmen. They occupy an
[1162] area of about 3,500 square miles (70 miles from east to west
x 50 miles from north to south). This central complex of
water sources is surrounded by a belt of waterless, uninhabited
country that varies in width from sixty miles, on the east
and north, to over one hundred miles on the west and south.
Access to the interior is limited. One line of wells links
Tsumkwe in the interior with Grootfontein on the west.

[149] Two rarely used motor tracks join the interior with the
Okavango swamp to the east. A police patrol road cut in
1954-55 runs from south to north along the B.P./S.W.A. border.
The maximum vehicle speed obtainable on these tracks is 20 mph
[177] and trucks pass through about once a month. The difficulty
of the terrain, the lack of farming potential, and the scarcity
of water have deterred European and Bantu penetration of the
area.

[114] The distinction between periphery and interior has been
applied to the country of the central !Kung by John Marshall
(1957) and Lorna Marshall (1960:327ff). The present usage
differs from that of the Marshalls. They applied the term
"interior" to the Nyae Nyae ring of pans and regarded the
waterholes at /'ai/'ai, /Gam, and !angwa as peripheral. Since

Since
131 the Nyae Nyae peoples are closely linked genealogically to
133 the peoples of /'ai/'ai, /Gam, and :angwa, and since their
• 312 several territories are surrounded by an uninhabited belt
619 60-100 miles in width, it seems more useful to include all
the central water sources under the term "interior" and
consider all the other river dwelling and farm !Kung as peri-
pheral (see Map 7, p. 37).

121 This description of the subsistence ecology of !Kung
184 Bushmen therefore concerns the interior !Kung of the central
433 dialect division. It is not to be taken as representative
of the !Kung in general, the great majority of whom are today
living on European farms or working closely with Bantu.¹ It
was pointed out in Chapter I that the selection of a study
site was dictated by the necessity of finding a Bushman
population living traditionally and independently. It was
realized at the outset that such a population was not typical
of the majority of !Kung.

¹ A further stricture must be applied to the !Kung of the interior. In 1960 a Government Station was built at Tsamkwe, S.W.A. Since then the 800 interior !Kung on the South West African side of the border have settled there and are receiving instruction in agriculture. The 400 !Kung on the Bechuanaland side of the border have not been permitted to participate in this program. Therefore, during the period of the present study, only the interior !Kung in Bechuanaland were leading a year-round hunting and gathering way of life.

III. THE DOBE AREA: ITS PEOPLES AND HISTORY

- [13] Dobe, a small waterhole on the South West Africa/
[114] Bechuanaland border, ninety miles west of Nokaneng, B.P.,
was the location of the author's main field camp. The term,
"Dobe area", as used in this report refers to the country
• [312] within a thirty mile radius of the Dobe well. This includes
the eleven permanent waterholes which support the entire
population of Bushmen and Bantu in the Bechuanaland sector
[224] of the !Kung interior. The Dobe area also includes a large
[222] tract of ground in South West Africa where Bechuanaland
Bushmen traditionally go to hunt and gather. It does not
include the Nyae Nyae pans, /gam and Tsumkwe in South West
Africa, or the more distant waterholes at n'aun'au, at
!audum, or at Tsodilo Hills in Bechuanaland (see Map 8).

Dobe is not the cultural or administrative center of
the settlements of the interior !Kung. On the contrary,
Dobe is the most isolated of the waterholes on the Bechuana-
land side. The term "Dobe area" is applied here simply as
a matter of convenience.

To reach the Dobe area by truck, one drives west from
the Batawana town of Nokaneng which is situated on the
western edge of the Okavango swamps. After traversing un-
inhabited country for 67 miles the traveller arrives at

[131] :goše, the first waterhole of the area. Continuing southwest
[133] from :goše the motor track parallels the course of a dry
river bed called the :angwadum for 23 miles until it meets

[131] the South West Africa border track. Along this route from
• 312 :goše to the border one passes the waterholes of Kamburungu,
:angwa matse, :angwa, Bate, Kathikona, Mahopa, :Kabe, and
:tšai. Each of these wells supports Bushman groups and Bantu
cattle posts. Following the border track north from its
intersection with the :angwadum one can reach Dobe which
supports a resident population of Bushmen but no Bantu.

[133] Turning south from the intersection, one crosses the low
ranges of the Aha Hills which are usually uninhabited and
arrives after 25 miles at /ai/ai, a large waterhole with over
one hundred Bushmen.

[131] All these centers of habitation lie to the east and
361 south of Dobe. To the north, the nearest settlement is
n:aun:au at a distance of 40 miles and, to the west, the
nearest settlement is Tsumkwe, 35 miles away (see Map 8).

[131] Eight naturally occurring waterholes support the bulk
312 of the Dobe area population which in November, 1964, stood
[161] at 763 people. There were 433 Bushmen residents, all but one
[563] of them members of the :Kung tribe. There were 340 Bantu,
eighty-five percent of whom were of the Herero tribe. The
remaining Bantu were Batawana, Mbukushu and Bayel.

- 312
161 The waterholes and their respective Bushman and Bantu
563 populations are listed in Table 2.

!Kung group structure

- 621 The definition of the !Kung living arrangements presented
166 the most difficult problem of the field study. The !Kung
were found to be living most frequently in camps that num-
bered from ten to thirty individuals. But the composition
of these camps changed from month to month and from day to
day.

The task of defining the stable membership units was
complicated by the following factors:

1. the frequent shifts of individuals and families from one
camp to another,
- [574] 2. the high incidence of visiting between camps,
3. the presence of long-term visitors from outside the
Dobe area,
4. the Dobe area residents who were living elsewhere on
extended visits, and
- [563] 5. the intermarriage and co-residence of Bushmen with Bantu.

These complications are in addition to the routine
changes in group structure brought about by births, deaths,
post-marital residence, and the seasonal subsistence cycle.

- It became evident that flexibility is the basic premise
[121] of !Kung group structure. It would therefore be inappropriate
to try to impose a formal model of organization on the data,

16: Lee E-5 (1963-1965) 1966 FX10 Bushmen FX10
!Kung

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TABLE 2

The Numbers and Distribution of the Bushman
and Bantu Populations of the Dobe Area

<u>Name of Waterhole and Location</u>	<u>Population</u>	
	<u>Bushman</u>	<u>Bantu</u>
1. :gose -- 23 miles east of Dobe	62	18
2. :angwa -- 13 miles east of Dobe	36	49
3. Bate -- 12 miles southeast of Dobe	45	21
4. Mahopa -- 7 miles east of Dobe	42	65
5. :Kabe -- 3 miles east of Dobe	8	12
6. :ubi -- 5 miles south of Dobe	52	65
7. /ai/ai -- 27 miles south of Dobe	109	67
8. Dobe	36	--
Three other wells, dug in recent years by the Bantu, support the remainder of the population:		
9. Kathikona -- 10 miles east of Dobe	1	8
10. :angwamatse -- 17 miles east of Dobe	9	23
11. Kamburunqu -- 19 miles east of Dobe	1	12
<u>TOTALS</u>	<u>4011</u>	<u>340</u>

¹The total of 433 is arrived at by the addition of 32 !Kung who were outside the Dobe area at the time of the census.

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• 312
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16: Lee E-5 (1963-1965) 1966 FX10 Bushmen FX10
!Kung

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621
166 such as the patrilineal band or composite band models current
121 in the literature (Steward 1955, Sahlins 1959, Service 1962).

121 An account of the situation at one waterhole will serve
621 to illustrate some of the dynamic processes at work in !Kung
312 group structure. At Dobe in October, 1963, there were two
621 camps, one with 28 members, the other with ten members. In
312 December, 18 members of the larger camp left on an extended
166 visit to Tsumkwe and the remaining ten people made a joint
162 camp with the smaller group to form a camp of twenty people.
In January, 1964, these two segments split up and abandoned
Dobe altogether. The waterhole remained unoccupied until May,
1964, when the two segments recombined and were joined by 22
other people, who came in from five other camps. This group
of 42 people wintered at Dobe in one camp. Then, in August
the camp split up into a camp of twelve and a camp of 24.
Six of the 22 people who had wintered at Dobe returned to
other camps while 16 of these people remained at Dobe. The
two Dobe camps (of twelve and 24) remained approximately
stable for the remainder of the study (i.e. until January,
1965).

621 Thus at different times of the year the population of
312 Dobe was counted as follows:
161

162	October 1963	38 people in 2 camps
	December 1963	20 people in 1 camp
	Jan.-April 1964	nil.
	May 1964	42 people in 1 camp
	Aug. 1964 to Jan. 1965	36 people in 2 camps

621 Similar variations in group structure were observed at
• 312 all the waterholes of the Dobe area. However, despite these
shifts in the size and composition of camps there were two
lines of evidence that indicated stability. First, there
was a generally acknowledged nucleus of permanent territorial
residents at each waterhole. Second, when camps split up they
did so consistently along the same lines of fission. The
presence of these two regularities provides a basis for a
preliminary account of the living arrangements of !Kung Bush-
men. The complete documentation and analysis of group struc-
ture will be presented in a later paper.

[125] The starting point for this account is a single complete
census of the Dobe area made by the author in November, 1964.
This was a good time for a census because it is the period of
[221] the year when the camps are most stable. It was the end of
the dry season when most of the Bushmen were restricted to
their permanent waterholes.

621 This census showed a total population of 433 Bushmen
161 divided among 35 living units. This figure of 433 includes
162 ten individuals who died in the year preceding the census,
and 32 others who were away from the area at the time of the
census, so that the total number of Bushmen who were actually
physically present in the area in November, 1964, was 391.
The majority of the people (311 individuals, 72% of the total)
were living in 15 independent hunting and gathering bands.

621 territoriality and band membership are closely linked they
will be discussed together in Chapter VII.

621 A note on the history of each waterhole during the period
• 312 1963-64 will serve to illustrate some dynamic features of
16 group structure.

1. !goše - There were three bands living at this
waterhole at the time of the census, numbering 12, 19, and
22 individuals, respectively. These three bands had lived
in one large camp from 1961-64. In mid-1964, they split into
four bands. One group of 13 went to Nokaneng on an extended
visit. The other three bands, totalling 53 people, remained
at !goše. The territorial nucleus of the three bands that
remained consisted of the descendants of one very old woman
and her three nephews.

2. !angwa - One band of 22 individuals was living
here. The nucleus of this group included again a very old
woman, her daughter and her son. Most of the members of the
group were siblings of the daughter's husband. This band made
a common camp with the members of the Batawana headman's
staff. In July, 1964, they set up an independent camp.

3. Bate - One band of 21 members was living here. The
nucleus consisted of two old women who were sisters and the
two married offspring of these sisters. The remainder of
the band consisted of affines of the sisters' children. In

16: Lee E-5 (1963-1965) 1966 FX10 Bushmen FX10
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• 312 late 1964, this entire band left Bate and shifted to !Xabe,
16 a waterhole about seven miles away.

4. Mahopa - In 1964, there were no bands at this waterhole although some 43 Bushmen lived here in Bantu villages.

5. !Xabe - No band had lived here for several years until the group arrived from Bate.

6. !ubi - One band of 52 members was living here. The nucleus consisted of an old man and his two sisters. The old man and 31 other members of this band alternate yearly between Tsumkwe, South West Africa, and !ubi, Bechuanaland. They appeared to be in the process of shifting permanently out of the Dobe area. The two sisters and 18 other people continued to live at !ubi.

7. /ai/ai - In November, 1964, there were five bands here with 9, 12, 17, 27, and 30 members, respectively. Each band has a nucleus of an old man or woman and their married offspring. In October, 1963, most of these people were living in one large camp of 83 members. In 1964, this camp broke up into six smaller groups. One group went south to /gam and five groups remained. In addition, a number of people came from /gam to live at /ai/ai, thus producing the present situation of five camps totalling 95 individuals.

8. Dobe - There were two bands here of 12 and 24 people, respectively. The territorial nucleus consisted of

- 621
● 312 an old man and his sister. When the two Dobe groups divided,
16 the old man and his two married children went one way and the
old woman and her three sons went the other.

The remaining two bands were living outside of the Dobe area at the time of the census. One of them was the band of 13 from :goše that had gone to Nokaneng. The other was a group of 19 individuals who came from South West Africa to spend the summer of 1963-64 in the Dobe area and had returned to Tsumkwe in May, 1964.

- 621 These brief notes indicate the extent to which bands
312 coalesce and split, change waterholes and move in and out of
166 the Dobe area. It does not take into account the corresponding
621 shifts made by individuals and families. In light of the above
it is doubtful whether the use of the term "band" is legitimate
in the context of Bushman group dynamics. The "band" may
turn out to be an artifact of the observer's sampling technique and his theoretical preconceptions (see Chapter VII).
Among the !Kung, for example, it appears that the cohesive
social units are the extended families that make up the larger
aggregations that have been called bands. This does not
imply that the !Kung have what Steward (1955) called a
"family level of organization" since the !Kung consistently
live in aggregations of two to ten or more families. Until
a complete analysis of the data is carried out, it would

16: Lee E-5 (1963-1965) 1966 FX10 Bushmen FX10
!Kung

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The major trees of the dune association are:

Riciodendron rautanenii¹

Burkea africana

Pterocarpus angolensis

Baikiaea plurijuga

Terminalia sericea

Other important constituents include:

Combretum mechowianum

Bauhinia macrantha

Ximenia caffra

Strychnos pungens

S. spinosa

Guibourtia coleosperma

[262]

Riciodendron rautanenii (the mongongo nut), the major

food of the Dobe area Bushmen, is found only on the crests of

•

[312]

the fixed dunes. Because of the loose nature of the soils

there is no standing water on the dunes at any season of the

year. The only source of water on the dunes is the rain

water which collects in the crotches of the mongongo trees

from November to March. Although the volume of water stored

is minute, the proximity of the supply to the nut groves

makes this an important source of water for the Bushmen.

¹The common tree species were identified with the aid of Miller (1952).

137 These include:

Combretum imberbe

Hyphaene ventricosa

Dichrostachys glomerata

Grewia flava

The most important food plants of the Molapo association are:

Adansonia digitata

Hyphaene ventricosa

Grewia flava

Citrullus lanatus var. vulgaris

• 312 The Molapo zones, being the lowest parts of the landscape, contain all the sources of permanent and seasonal standing water.

The permanent waterholes are confined to main river bottoms where the limestone is exposed. Most of these waterholes are natural fissures in the rock, but all have been improved and maintained either by the Bushmen themselves or the Bantu cattle herders.

The seasonal waters that exist for one to six months of each year are found both in the main river bottoms and in the dune interstices where local drainage patterns produce a catchment. These latter vary in size from small depressions 25 feet in diameter and a few inches deep, which hold water

16: Lee E-5 (1963-1965) 1966 FX10 Bushmen FX10
!Kung

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- 312 for a few weeks after heavy rains, to great ponds up to 400 feet long which may hold water several months after the rains have ceased.

134 III. The 'Flats' Association: Intermediate in elevation

137 between the dunes and the molapos are plains of buff to white compacted sands. These plains or flats support a vegetation which has affinities to both the dune and molapo associations. It also contains species that are not found elsewhere.

The flats may be divided into two intergrading types on the basis of soil differences:

- a) looser buff sands supporting species that extend into the dune association and also several other diagnostic species.
- b) compacted white sands supporting species that extend into the molapo association as well as several other diagnostic species.

III. a) Flats of loose sand have the following diagnostic species:

Lonchocarpus nelsii

Acacia giraffae

A. gillettiae

A. fleckii

as well as:

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vegetation and water.

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• 312

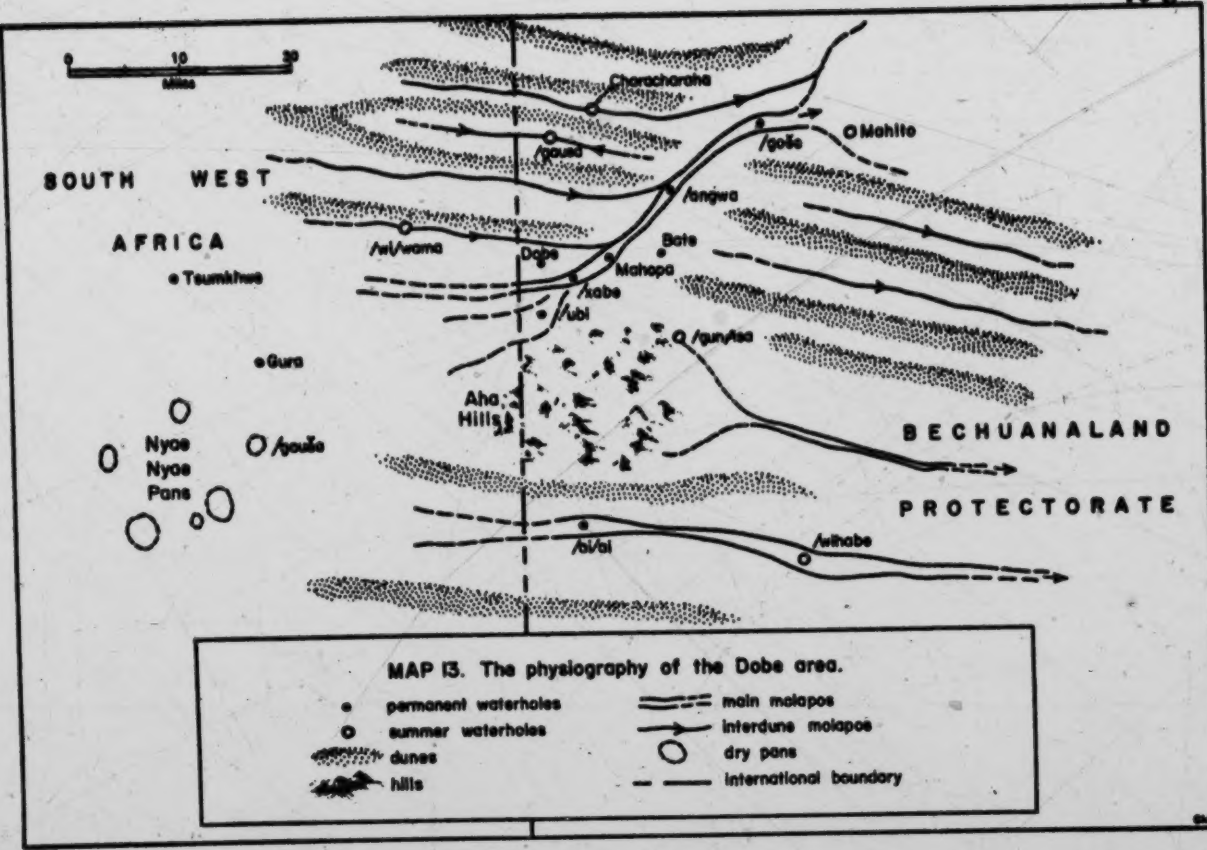
Map 13 shows the physiography of the Dobe area. The area enclosed is approximately 2,700 sq. miles. The large river course (upper right) flows from west to east (it runs about once in ten years) and contains four of the eight permanent natural waterholes in the area. Three additional waterholes are located on limestone flats within a few miles of the main course. The eighth waterhole is in the large molapo at the southern edge of the map. In addition, there are three small wells which have been dug by the Bantu in recent years. All are situated in the main !angwa molapo.

Six interdune molapos are shown by single black lines. The waters of three of these may reach the main river in flood years. In most years, however, they fill internal drainage basins only. The directions of flow are indicated by the arrows. Five of the larger summer waters are represented as open circles in the molapos. The map shows clearly how the main molapos and the hills interrupt the east-west parallel orientation of the dunes. The areas not represented as dunes, molapos, or hills are flats and transitional vegetation zones. It will be noticed that west of Dobe the flats extend in a broad band 10 miles deep on either side of the molapo. Elsewhere the flats form narrow belts between the dunes and molapos.

Map 13 will be used in subsequent chapters as a base map

(REAL CONTINUED ON PAGE 81)

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16: Lee E-5 (1963-1965) 1966 FX10 Bushmen FX10
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dates of onset and termination of the main rains. For instance, in 1963-64, the major rains were concentrated in an eight-day period in late November and early December and were very light during the next three months. In the following rainy season, 1964-65, the major rains came later. They were only just beginning when we left the study area in

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January, 1965. During the period of the main rains, the major summer foods (fruits, berries, melons) make their appearance, and there is standing water in the molapos far from the permanent wells.

3. !dobe (autumn) -- The autumn season is brief. In

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1964, it fell in April after the rains had ceased. The weather remains warm and the high evaporation rates rapidly dry out the pools of summer water.

4. !gum (winter) -- This cold dry season extends from

May through August. It is heralded by a sharp drop in nightly temperatures and during 1964 the Dobe area experienced six weeks of freezing or near-freezing nights in June and July. The days are clear and, by tropical standards, cool, often characterized by strong dessicating winds from the south and west with gusts estimated at up to 40 knots.

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Water is available only at the permanent wells and plant foods become increasingly scarce as the season progresses.

5. !ga (early spring) -- This season begins in late

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August with a rapid increase in daily temperatures and ends in October or November with the onset of the first rains. It is a hot dry period during which water and food supply reach their annual low levels. However, the increasing day-length appears to prepare the flora and fauna for the season of reproduction which is triggered by the first rains.

Rainfall

Until 1961 there was no weather station in the central !Kung interior. In that year a rain gauge and other recording instruments were established at Tsumkhwe, South West Africa, a government station 35 miles west of Dobe. The data from this station are not available to the author. The only other sources of rainfall data are the author's fifteen-month series of measurements made at Dobe (1963-64) and the long-term records from stations on the periphery of the Kalahari. The peripheral stations and their rainfall are listed below:

South West Africa

Epukeiro - (200 miles southwest of Dobe) - 13.2 inches per annum.

Grootfontein - (200 miles west of Dobe and 1,000 feet higher in elevation) - 17.3 inches per annum.

Bechuanaland Protectorate

Ghanzi - (175 miles south of Dobe) - 18.5 inches per annum.

242 nutritious.¹
824

It should be added that meat is considered by all the Bushmen as a primary food. Informants agreed that an ideal diet should consist primarily of meat and mongongo nuts. In actual practice this ideal is not always attained.

II. Major foods - After Ricinodendron there are eight species that Bushmen consider as major foods but none of these rate high on all five criteria of desirability. There are three species which are superabundant in quantity and delicious to the taste, but are available for only a short period of the year. They flourish during the rains but by winter, three months later, they have become shrivelled and dried out. The three summer species are: Grewia flava, the morethlwa berry; Ximenia caffra, the sour plum; and Citrullus lanatus, the famous Tsama melon. The latter species also serves as an alternative source of water but this is not important in terms of food strategy because the season of Tsama melons coincides with the season of abundant standing water. Among the /gwi Bushmen of the Central Kalahari Game Reserve, the Tsama melon is a more important source of water because it

[146] ¹The nut of Ricinodendron has been chemically analyzed (quoted in Watt and Breyer-Brandwijk 1962:428). The kernel of the nut was found to yield 60%, by weight, of a quick-drying fixed oil, rich in proteins. The fruit of the nut, which is also eaten by the !Kung Bushmen, yielded, among other constituents, 31% saccharose and 7.9% protein.

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Bauhinia esculenta, the "Tsi bean", ranks with Ricino-
dendron as the primary food of the Nyae Nyae Pan area (L.
Marshall 1965), where both the beans and roots are eaten.
In the Dobe area, however, this species of Bauhinia has a
spotty distribution. In order to reach the large groves,
the Dobe area Bushmen must travel long distances to the bor-
ders of the Nyae Nyae area. Because of this factor, the
"Tsi bean" is not popular in the Dobe area, where the alter-
native primary food, Ricinodendron, is locally abundant.

- [312] The last of these eight major species is, in a sense,
the most important, not because of its abundance or its food
value (it is neither plentiful nor nutritious) but because
of its water storage properties. This is the plant, Fockea
monroi, the root of which may contain up to a pint of water.
At the end of the dry season when food has become exhausted
within a walking radius of the permanent waterholes, people
often move into the waterless bush where food is still plenti-
ful. Here they are able to live for one or two weeks by
digging out and drinking the juice of the Fockea roots.

It may be useful to think of Ricinodendron and Fockea
as the "alpha" and "omega" of the Bushman food plants. The
first, Ricinodendron, is the food that carries the Bushmen
through the months and years, while the second, Fockea, is the
critical plant that enables the Bushmen to eat well through

VII. LAND UTILIZATION

361 During 1963-64, the Dobe area was divided into nine territories within which the 15 independent camps were operating. These nine territories together covered about two-thirds of the total area (see Map 14).

• 361 There was not a direct relationship between the number
• 312 of permanent waterholes, the number of territories and the number of independent groups. Although all of the independent groups had access to a permanent water, some of the permanent waters supported several groups, while at other permanent waters independent groups were lacking.

The number of territories and number of groups at each waterhole is shown in Table 6.

[222] At !go!e there were four camps but all these camps moved within the same collecting areas. Similarly, for part of the time, there were two camps at Dobe but both camps utilized the same groves of nut trees and the same summer waterholes.

On the other hand, at /ai/ai three of the five camps had their own territories, while two of the camps shared a territory. The jointly occupied territory lay to the north of the /ai/ai waterhole, and the three other camps operated to the west, to the south, and to the east of /ai/ai, respectively.

At the !angwa, Bate, and !ubi waterholes, the situation

[TEXT CONTINUED ON PAGE 136]

16: Lee E-5 (1963-1965) 1966 FX10 Bushmen FX10
!Kung

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TABLE 6

The number of camps and the number of territories based on each of the permanent waterholes in the Dobe area.

<u>Name of Waterhole</u>	<u>No. of Independent Camps</u>	<u>No. of Territories</u>
1. !goše	4	1
2. !angwa	1	1
3. Bate	1	1
4. Mahopa	0	0
5. !xabe	0	0
6. !ubi	1	1
7. Dobe	2	1
8. /ai/ai	<u>5</u>	<u>4</u>
	14 ¹	9

¹The 15th independent group had its permanent waterhole at Tsamkhwe, outside the Dobe area.

361
• 312 was simple. Each waterhole supported one independent camp
and each camp had its own territory.

Two of the waterholes, Mahopa and !xabe, lacked independent camps and therefore were not part of a territory.

[648] The Bushmen who drank at these waterholes lived in Bantu
[222] villages. They collected food in the adjacent territories
of other camps such as Dobe !ubi and !angwa (see Map 14).

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602 The sharing of a single territory by two or more camps
reflected the close kinship ties between the camps. This

was obvious at Dobe where the leaders of the two camps were
a brother and sister who often brought their two groups
[562] together to make a common camp. It was also obvious at
!goše where the four camps were led by descendants and
collaterals of one old woman. In previous years these four
independent groups at !goše had lived in one large camp.

361 The territorial arrangements of the Dobe area !Kung
Bushmen, like their group structures, were extremely flexible.
Most territories overlapped with one or more adjacent territories.
The boundaries of territories were vaguely defined
and there were areas between territories which were not claimed
by any of the camps. The Bushmen did not conceive of territories
as areas of exclusive occupation. The concept of territorial
defense was lacking. Each territory consisted, in
the words of Mrs. Marshall, of "a waterhole and a side" (L.
Marshall 1960:334). This point is illustrated in Map 14.

16: Lee E-5 (1963-1965) 1966 FX10 Bushmen FX10
!Kung

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- 361 Each of the groups moves in a "direction" from its waterhole.
• 312 For instance, the Dobe people move to the west and north,
the !angwa people move to the northwest, and the !gose people
move to the east.

361 The concept of territoriality as applied to the Bushmen
differs from the concept used by zoologists in discussing
the spatial arrangements of animals. The zoological usage
refers to the exclusive use of space, by an organism or group
of organisms who defend this space against competing members
of the same species (Bourliere 1964:94-100).

By contrast the Bushmen groups do not defend boundaries
and members of all groups travel freely between camps.

However, land utilization is not at all a random phenomenon.

[222] The Bushmen population is organized into land-holding units,
[224] and the members of a unit tend to spend the greater part of
the year hunting and gathering within a specific area.

Thus, in the context of this study, the term "territory"
refers to the area within which an independent camp moves
during the annual subsistence cycle.

361 The locations and spatial configurations of territories
824 are determined by the distribution of water and food resources.
[312] Each territory has within it a permanent waterhole, one or
more seasonal water sources, and one or more mongongo nut
forests. Every territory includes, in addition, a selection

311 area of each territory.

• [312] Second, the area and shape of an individual territory is
[824] influenced by the distance between the important resources within it, such as water sources and mongongo nut forests. It is these point resources and not the spaces between them that are the significant features of the landscape.

Third, territories overlap each other and there is disagreement as to the ownership of these overlapping areas. Most Bushmen say that these areas are owned by all, which means, in effect, that they are owned by no one.

Each of these features will be discussed in detail.

1. Hinterland - It was mentioned earlier that the Dobe area [312] was surrounded by a belt of uninhabited country. Except for a few summer months there is no standing water in this belt and, as a consequence, the Dobe area people rarely bother to hunt and gather within it. This outer belt is not lacking [136] in food resources, however. Surveys of the country by Land- [137] rover indicate that the game and plant foods there are even more abundant than they are within the traditional territories. Why then are these resources so infrequently utilized?

311 The answer lies in the fact that the Bushmen can usually
312 satisfy their annual subsistence requirements within a radius
361 of 15-20 miles from their permanent waterholes. Whenever possible the Bushmen prefer to make their camp sites at

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standing water sources. Since the number of these water sources is limited, it follows that the areas around the water sources will be the most intensively utilized. The Bushmen know how to live on alternative sources of moisture such as Fockea monroi but only resort to this subsistence strategy for a week or two at a stretch.

It is a good rule of thumb for the Dobe area that the intensity of utilization of land varies inversely with the

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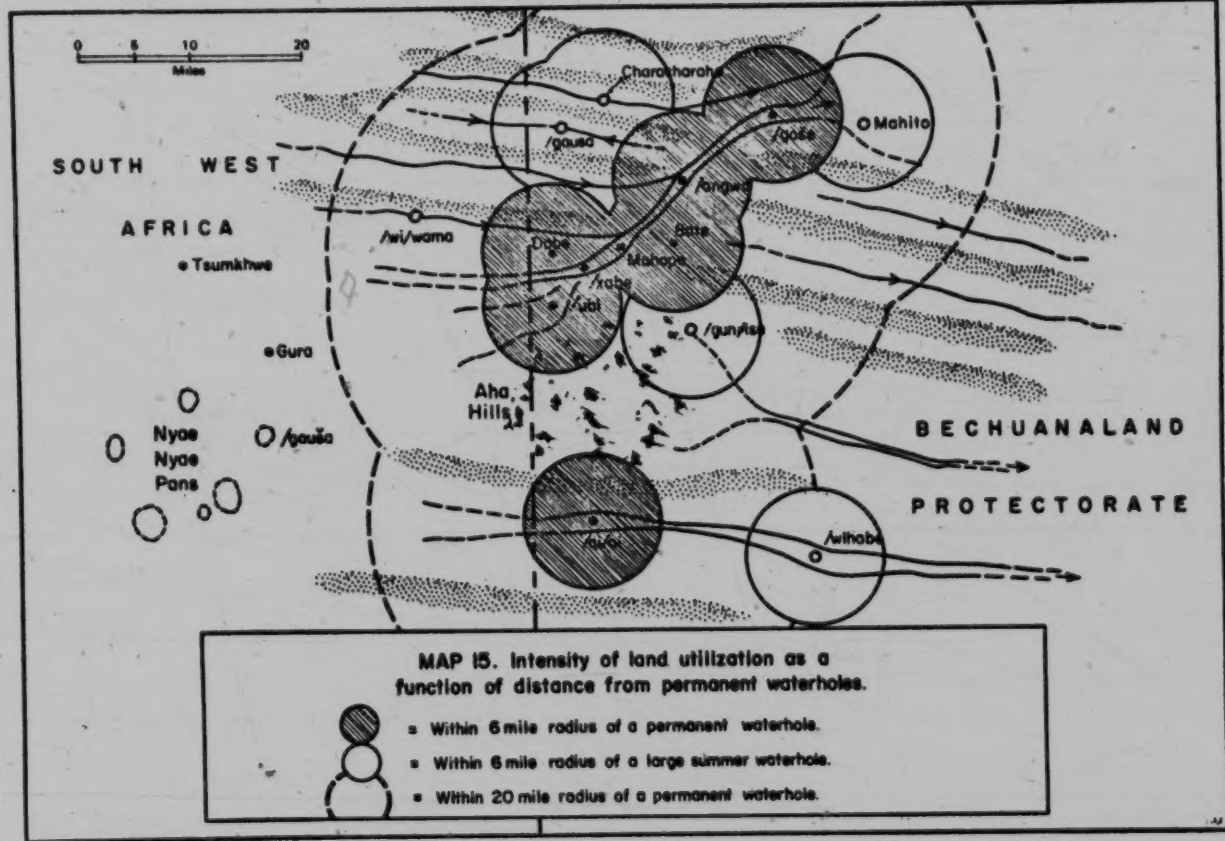
distance from standing water sources. Since a Bushman group must spend the six dry months of the year at its permanent waterhole, it is not surprising that the area within a walking radius of this waterhole is intensively utilized. Similarly, since the Bushmen spend three months of the year at the large summer water sources, the areas within a walking radius of these water sources is also intensively utilized. During the brief period in December or January when there is standing water at many localities, the Bushmen can utilize areas that lie beyond a walking radius of the major water sources.

These three levels of intensity of utilization are illustrated schematically in Map 15. This scheme disregards for the moment the actual pattern of distribution of food resources peculiar to each territory. The shaded circles enclose all of the areas that are within a six mile radius of a permanent waterhole. These are the only areas that can be reached by

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16: Lee E-5 (1963-1965) 1966 FX10 Bushmen FX10
IKung

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311 a round trip hike of 12 miles or less.

• 312 The distance of 12 miles was chosen for this illustration,
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221 because this was close to the maximum distance that the Bushmen were willing to walk in a single day of food gathering.

In the previous chapter it was mentioned that Bushmen hunters and gatherers do not stay away from their camps overnight. Therefore an individual hunter or gatherer will confine the day's activities to within a limited radius of his or her camp. These expressed preferences set the limits on the size of the winter areas of intense utilization.

A similar situation exists in the areas that are within a six mile radius of the main summer water sources. These are represented on Map 15 as unshaded circles. These further areas are intensively utilized during the summer months.

These areas of intensive utilization are surrounded by a belt of country that lies within a twenty mile radius of the permanent waterholes. Twenty miles was the average maximum distance from permanent water that the Bushmen were observed to range. This belt is enclosed by a dotted line in Map 15. It should be noted that the Bushmen groups spent on an average less than one month of the year working these areas. The great majority of their time was spent closer to the standing water sources.

311 The Dobe area Bushmen were not observed to make camps
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311 beyond the area enclosed by the dotted line, and this line
361 therefore accurately represents the total utilizable space
of the Dobe area.

- 311 2. Point resources - In Map 15, the picture of land utili-
• 312 zation was simplified by omitting the actual patterning of
361 food resources. In fact, the extent and configuration of
824 the intensively utilized areas is influenced by the location
of the mongongo nut forests and the distance of these forests
from the permanent waterholes. These resources are plotted
in Map 16. For instance, in an area where the mongongo nuts
within a walking radius of water are sufficient to support a
camp throughout the year, a group's territory will be small.
However, in an area where the mongongo nuts are less locally
abundant, the territory must, of necessity, be much larger.

The people of !goše, for example, are fortunate in having
a vast nut forest within a ten mile radius of their waterhole.

[162] The nuts from this forest are abundant enough to support the
62 members of the !gose camp throughout the year. By contrast,
the nut forests near Dobe are much less abundant than at !goše.

[162] The 36 members of the Dobe camps have to walk farther (up to
18 miles at the end of the dry season) in order to collect
the mongongo nuts. As a result, the effective annual terri-
tory of the Dobe people is larger than that of the !goše people,
despite the fact that the population of Dobe is smaller than

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• 312 the population of !gose (this is illustrated in Map 14 as well
361 as in Map 16).

A further example will serve to illustrate how point resources influence the size of territories. It was mentioned above that each territory contains one or more large summer water sources. In most cases these summer waters are less than 12 miles from the permanent waterholes. In one case, however, the summer water is 23 miles distant from the permanent waterhole. The summer water at /wihabe belongs to the group of 27 people that works to the east of /ai/ai (see Map 14). This group lays claim to the land between /ai/ai and /wihabe. But they do not utilize this area in their subsistence activities. Rather they hike through it in order to move from one point resource to another, i.e. from their winter water at /ai/ai to their summer water at /wihabe.

3. Territorial overlap - Territories are so loosely defined by the Dobe area !Kung that certain areas are claimed by none of the camps and consequently are utilized by everyone. Wherever territories adjoin, there is a belt of "no-man's land" for which no one is prepared to make a definite statement of ownership. This uncertainty is usually expressed by informants as follows: "The owners of this land died long ago, today we don't know who owns it."

The Aha Hills illustrate this territorial overlap. The

16: Lee E-5 (1963-1965) 1966 FX10 Bushmen FX10
!Kung

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hills hold standing water only during the summer months.

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During this season, the members of two /ai/ai camps, the 'ubi camp, and the Bate camp mingle freely at its water sources.

This mingling of groups also occurs at some of the large summer pans such as :gauša and čaračaraha where members of different winter groups come together for weeks or even months.

The foregoing discussion has highlighted the flexible nature of !Kung Bushmen territoriality. This flexibility is manifested in the frequency of visiting between waterholes, the vagueness of territorial boundaries and the existence of food areas that are said to belong to nobody.

VIII. WATER AND THE SEASONAL ROUND

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The Kalahari desert is not a food poor area. Most of it is situated between the 10 and 20 inch isohyet and therefore it is marginal for cultivation (without irrigation), but the desert supports a remarkable abundance and variety of edible wild plants which have become genetically adapted to arid conditions.

Geographers have classified the Kalahari as "desert" because of the lack of surface water (Wellington 1955 etc.). This in turn is a function of the sandy terrain which supports surface water only during a brief summer season. In the few localities where the underlying geological formations are exposed, permanent standing water is found. And these point sources of water are usually surrounded by waterless belts of

- 312 up to 200 miles in width. Edible plants on the other hand
- 824 are widely distributed both in the immediate vicinity of water
- 433 and at considerable distances from it. The geographical separation of food and water in certain seasons is the critical
- 221 problem of !Kung Bushman subsistence.

This is not a major problem during the rainy season when seasonal standing water may be found in close proximity to the concentrated food resources. Nor is this a major problem during the early winter when food is available around the

312 permanent water sources. Nevertheless for one season every
221 year Bushmen must face a situation in which major foods and
433 permanent water are a considerable distance apart. How Bush-
824 men arrange their lives to meet this situation will be illus-
trated by data from the Dobe area !Kung Bushmen.

312 According to the Bushmen, water has always existed in
824 the eight permanent waterholes of the Dobe area. Seven of
222 these waterholes are situated in or near the dry bed of one
molapo, the !angwadum. The eighth, 25 miles to the south, is
in the bed of another molapo, the /ai/aidum. These molapos
lie in the center of a belt of flatlands which varies in width
from 5-10 miles. It was pointed out in Chapter IV that the
molapos interrupt the basic system of parallel dunes that cover
most of the northwestern Kalahari. But it is only on these
dunes that the primary Bushman food, the mongongo nut, is
found. The result is that each of the eight waterholes is
three to seven miles distant from the nearest grove of mongongo
nuts. Thus gatherers who are camped at a permanent water must
make a minimum daily round trip of six to fourteen miles in
order to gather mongongo nuts. As the nearest nuts become
exhausted the round trip distance becomes greater and greater,
until it reaches a distance that is too far to walk in a day.
This distance varies from camp to camp but 12 miles (6 miles
out and 6 miles returning) was close to the maximum that the

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824 people were willing to walk in a single day for the purpose
222 of food gathering. In order to exploit food resources further than seven miles from water, the Bushmen feel that it is necessary to make a temporary camp at the food and stay over-night.

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222 The options available to Bushmen facing such a situation are three: 1) they may carry water to the food and live there until their water is exhausted; 2) they may move to the food and dig water-rich roots to satisfy their moisture requirements; or 3) they may wait until rainfall produces standing water nearer the desirable foods.

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147 There are no physiological short cuts to solving the water problem. There is no evidence that the Bushmen's daily water requirements are less than that of other peoples (Wyndham in press; Silberbauer 1965). Like all peoples, the Bushmen must drink water to live and their daily requirements are a function of such factors as ambient air temperature, wind velocity and the work they have to do¹ (Ladell 1958; Adolph et al. 1947).

¹Ladell, a physiologist specializing in problems of human life in arid regions has said: "It can be categorically stated that no man of any race, however acclimatized and trained, can survive in a hot desert climate without very liberal supplies of water; there is, and can be, no substitute for water and there is no remedy for its deficiency". (1958:85).

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221 The availability of water can be regarded as the most important determinant of Bushman subsistence activities. A season by season account of these activities will serve to illustrate how subsistence strategies take maximum advantage of water sources. The annual subsistence cycle is described under six headings:

1. First rains
2. Main rains
3. Autumn
4. Early winter
5. Late winter
6. Spring

1. First rains

The onset of the first rains finds the Bushmen clustered [361] around their permanent waterholes. It is this time of year [574] that camp membership is most stable because all areas are short of food and there are fewer incentives for visiting [132] other camps. Also the weather is hot with mean daily maxima of 100°F and walking is uncomfortable.

312 Food, in the vicinity of permanent water, is in short
221 supply. Fruits, berries, melons and leafy greens, which appear
824 only during the main rains, are nowhere available. The mon-gongo nuts are still abundant but are found only at distances of ten or more miles from the permanent waterholes. The diet

312 at the waterholes consists primarily of roots and bulbs of the
221 genera: Eulophia, Vigna, Walleria, and Coccinia, and the edible
824 sap of Acacia spp. and Terminalia sericea. It is this time of
year that the heart of the dwarf vegetable ivory palm is eaten,

[164] (Hypheane). Those who eat its fibrous pulp experience stomach
cramps and diarrhea, but, as the Bushmen say, it make one's
"mouth work" and gives one a sensation of a full stomach.

221 Hunting is arduous business in the heat and men who go out in
224 the early morning find it necessary to spend the mid-day hours
resting in the shade. The principal animal killed is the
springhare.

132 The first rains are convectional thundershowers. Their
distribution is spotty. A storm may briefly inundate one area
and miss entirely another area only a mile away.

312 The Bushmen observe the storm clouds travelling across
222 the horizon and try to judge where the showers have drrenched
[821] the ground. They then set out in family groups in the direc-
tion of the rains. If they find that water has collected in
the hollows of mongongo trees, they will stay in the nut groves
for several days and eat nuts until the water is exhausted.
They then fill their karosses with nuts and return to the per-
manent water. If, on reaching the nut groves, they find that
no water has collected they will be forced to fill their karosses
with nuts and return to camp the same day. In certain areas